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ASSOCIATE CURATOR OF THE HERBARIUM, DEPARTMENT OF BOTANY

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# THE RUBIACEAE OF ECUADOR

PAUL C. STANDLEY

Botanically, Ecuador is least known of any of the countries that lie along the Andes. Colombia has been explored extensively, although far from completely, during the past ten years, and huge collections of plants have been received from Peru during the same period. The Bolivian flora has been collected somewhat intensively over an even longer series of years.

In Ecuador, however, few collections, and those small and altogether unsatisfactory ones, have been made recently. Perusal of the following pages will prove that little has been added to the knowledge of Ecuadorean Rubiaceae by late collections. What we do know of this family as it is represented in Ecuador is chiefly the result of the work of the older collectors: Humboldt and Bonpland; Hartweg; the picturesque Scotchman, Jameson, who resided for many years in Quito; and the indefatigable Spruce, who spent several rather painful although botanically profitable years in Ecuador. Sodiro botanized extensively in the country, but I have seen only a scattered few specimens of Rubiaceae of his collection. The work of Baron Eggers along the coast added a substantial number of species to the list here enumerated, and the handsome specimens obtained more recently by the Swedish collectors, Holmgren and Heilborn, have added still others. A good many species are represented only in the collections of André and Lehmann, both of whom are known better for their work in Colombia.

The only extensive recent collections from Ecuador are those of Dr. J. N. Rose and Professor A. S. Hitchcock, made for the United States National Museum, Gray Herbarium, and New York Botanical Garden, but neither of these adds much information regarding the Rubiaceae.

Most of the records of Ecuadorean Rubiaceae are the result of the labors of Jameson and Spruce. A few years ago I had the good fortune to travel from New York to Panama in company with an elderly Ecuadorean gentleman who had studied botany under Jameson. He related many anecdotes of his teacher to illustrate his eccentricities and his all-absorbing interest in botanical

exploration. It is some satisfaction to know that Jameson was honored by having named in his memory one of the most striking and curious genera of Andean ferns, a group inhabiting the cold paramos in which he delighted to botanize.

The Rubiaceae constitute one of the largest and most important families of the flora of Ecuador. Of particular interest here is the genus *Cinchona*. It was from the region of Loja, in southern Ecuador, that the virtues of these plants were first made known to the world, and Loja was long the principal center of production of Peruvian bark.

The number of species recorded in this paper is small in comparison with the nearly 500 species reported from Colombia, or with the list already compiled for Peru. There is no doubt that further exploration will add enormously to the known Rubiaceae of Ecuador, and probably double them. At the present time nothing is known of those growing along the Pastasa River and elsewhere on the eastern slopes of the Andes. Some genera and species are known from Colombia and Peru, but not from Ecuador, although there is every reason for assuming that they do grow in the intervening country.

The present enumeration includes the species native in the Galapagos Islands. Their inclusion is justifiable only on political grounds, although the few Rubiaceae existing in the Galapagos, chiefly species of *Borreria*, perhaps are as closely related to those of Ecuador as to those of any other region.

This list of the Rubiaceae of Ecuador is the result of the study of collections in the herbarium of Field Museum of Natural History (indicated on the following pages by the letter F), and in the herbaria of the following institutions: Royal Botanic Gardens, Kew (K); Botanic Garden and Museum, Berlin-Dahlem (B); Riksmuseets Botaniska Afdelning, Stockholm (S); Jardin Botanique Principal, Leningrad (L); United States National Museum, Washington (W); Gray Herbarium of Harvard University (G); New York Botanical Garden (Y); and the Academy of Natural Sciences of Philadelphia (P). To those in charge of these collections, who have lent material for study or have forwarded it for determination, the writer wishes to express his deep appreciation of the courtesies thus extended.

Of special service in preparing this enumeration have been the excellent photographs of type specimens of South American plants obtained at Berlin by J. Francis Macbride through a fund generously provided for the purpose by the Rockefeller Foundation. Special thanks must be given to the Director, Dr. L. Diels, and to the staff of the Berlin Garden for their whole-hearted cooperation in the

successful accomplishment of this project. The writer wishes to record, also, his special appreciation of the courtesy of Dr. K. Krause, in charge of the Rubiaceae at Berlin, who aided in selecting the types to be photographed, and also was responsible for forwarding for study a large and important shipment of South American Rubiaceae.

## KEY TO THE TRIBES AND GENERA[1]

Ovules 3 or more in each cell of the ovary.

Fruit dry.

Seeds winged, vertically imbricate.....I. *Cinchoneae.*

Seeds not winged or, if winged, horizontal.

Corolla lobes imbricate or contorted, never valvate.
III. *Rondeletieae.*

Corolla lobes valvate.

Seeds horizontal; stipules entire or bifid; plants trees or large shrubs.....II. *Condamineae.*

Seeds peltately attached; stipules often fimbriate; plants chiefly herbs or very low shrubs.....IV. *Hedyotideae.*

Fruit fleshy.

Corolla lobes valvate.....V. *Mussaendeae.*

Corolla lobes imbricate or contorted.

Seeds many, minute, pitted or rarely tuberculate.
VI. *Hamelieae.*

Seeds usually few and large, the testa smooth or fibrous.
VII. *Gardenieae.*

Ovules 1 or 2 in each cell of the ovary.

Ovules pendulous.

Stamens inserted in the throat of the corolla tube; fruit not compressed.....VIII. *Guettardeae.*

Stamens inserted at the base of the corolla tube; fruit compressed.
IX. *Chiococceae.*

Ovules erect or ascending.

Corolla lobes contorted.....X. *Ixoreae.*

Corolla lobes valvate.

Ovules affixed to the base of the ovary.

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[1]The key is adapted from that published by Wernham for the tropical American genera. See Journ. Bot. 54: 326. 1916.

Ovary 1-celled, or 2-celled but with a very thin septum. XII. *Coussareae.*

Ovary with 2 or more cells, the septum or septa thick.

Flowers perfect; stamens usually inserted in the throat of the corolla; plants usually trees or shrubs. XIII. *Psychotrieae.*

Flowers usually dioecious; stamens commonly inserted at the base of the corolla; plants mostly herbaceous. XIV. *Anthospermeae.*

Ovules affixed to the septum.

Stipules entire, not leaflike; plants trees or shrubs, the flowers in heads.....XI. *Morindeae.*

Stipules fimbriate or leaflike; plants mostly herbaceous.

Stipules fimbriate, not leaflike.....XV. *Spermacoceae.*

Stipules resembling the leaves and forming whorls with them.....XVI. *Galieae.*

## I. CINCHONEAE

Corolla lobes valvate.

Placenta pendulous from the apex of the cell; inflorescence spikelike. 1. *Alseis.*

Placenta not pendulous; inflorescence not spikelike.

Placenta ascending or erect from the base of the septum; plants usually scandent.....2. *Manettia.*

Placenta adnate to the middle of the septum; plants not scandent.

Capsule splitting from below upward.....3. *Cinchona.*

Capsule splitting from above downward.

Capsule loculicidal.....4. *Macrocnemum.*

Capsule septicidal.....5. *Ladenbergia.*

Corolla lobes imbricate or contorted.

Corolla lobes contorted; corolla salverform.....6. *Hillia.*

Corolla lobes imbricate; corolla funnelform.....7. *Coutarea.*

## II. CONDAMINEAE

Calyx persistent.....8. *Chimarrhis.*

Calyx deciduous.....9. *Condaminea.*

## III. RONDELETIEAE

Corolla lobes imbricate.....10. *Rondeletia.*
Corolla lobes contorted.....11. *Elaeagia.*

## IV. HEDYOTIDEAE

A single genus in Ecuador.....12. *Arcytophyllum.*

## V. MUSSAENDEAE

Inflorescence terminal.
  Inflorescence elongate, spikelike.....13. *Gonzalagunia.*
  Inflorescence thyrsiform-paniculate.....14. *Isertia.*
Inflorescence axillary.
  Leaves with many close parallel striolae in the meshes between the ultimate veins; plants not scandent.
    Inflorescence 1–3-flowered; leaves small.....15. *Hippotis.*
    Inflorescence many-flowered; leaves very large..16. *Pentagonia.*
  Leaves not striolate between the veins; plants usually scandent. 17. *Sabicea.*

## VI. HAMELIEAE

Ovary 4–5-celled; inflorescences terminal.
  Corolla lobes contorted in bud.....18. *Bertiera.*
  Corolla lobes imbricate in bud.....19. *Hamelia.*
Ovary 2-celled; inflorescences axillary.....20. *Hoffmannia.*

## VII. GARDENIEAE

Corolla tube villous in either throat or base, but not in both; testa of the seed not fibrous; chiefly shrubs, often armed with spines. 21. *Randia.*
Corolla tube villous in both throat and base; testa of the seed fibrous; unarmed trees.....22. *Genipa.*

## VIII. GUETTARDEAE

Corolla lobes imbricate in bud.
  Fruit dry, separating into 2 small cocci.....23. *Machaonia.*
  Fruit drupaceous, indehiscent.....24. *Guettarda.*
Corolla lobes valvate in bud; fruit drupaceous.....25. *Anisomeris.*

## IX. CHIOCOCCEAE

A single genus in Ecuador.....26. *Chiococca.*

## X. IXOREAE

Calyx calyculate at the base.....27. *Coffea.*
Calyx simple.....28. *Ixora.*

## XI. MORINDEAE

A single genus in Ecuador.....29. *Morinda.*

## XII. COUSSAREAE

Ovules connate, borne on a common basal column; seed vertical. 30. *Coussarea.*
Ovules separate, in a 1-celled ovary, collateral, basilar, the single seed horizontal.....31. *Faramea.*

## XIII. PSYCHOTRIEAE

Inflorescence an involucrate head.
  Seeds flat on the inner surface; creeping herbs with usually cordate leaves.....32. *Geophila.*
  Seeds deeply furrowed on the inner side; trees or shrubs. 33. *Cephaelis.*
Inflorescence without an involucre, the flowers usually not in heads.
  Stipules usually not pectinate; seeds deeply furrowed or flat on the inner surface.
    Corolla tube not gibbous at the base; inflorescence usually not thyrsoid; stipules often deciduous.....34. *Psychotria.*
    Corolla tube gibbous at the base; inflorescence usually thyrsoid; stipules persistent.....35. *Palicourea.*
  Stipules pectinate or with short subulate dorsal appendages; seed with inrolled ventral surface.....36. *Rudgea.*

## XIV. ANTHOSPERMEAE

Fruit pyriform, leathery, splitting into 2 cocci.....37. *Corynula.*
Fruit a succulent berrylike drupe.....38. *Nertera.*

## XV. SPERMACOCEAE

Fruit circumscissile.....39. *Mitracarpus.*
Fruit not circumscissile, separating into cocci.

Cocci more than 2.....40. *Richardia.*
Cocci 2.
Cocci indehiscent.....41. *Diodia.*
Cocci dehiscent at the base or apex.
Cells of the fruit unlike, one opening, the other remaining closed.....42. *Spermacoce.*
Cells of the fruit alike, both opening.....43. *Borreria.*

## XVI. GALIEAE

Flowers surrounded by a calyxlike involucre.....44. *Relbunium.*
Flowers not involucrate.....45. *Galium.*

### 1. ALSEIS Schott

**Alseis Eggersii** Standl. Field Mus. Bot. 4: 264. 1929.

El Recreo, *Eggers 15738* (F, type; B, K).

A tree; leaves petiolate, elliptic-obovate, acuminate, at the base obtuse and short-decurrent, soft-pilose beneath; flowers spicate, the spikes axillary, 13–17 cm. long, the rachises minutely pilose; capsules cylindric-clavate, 8–11 mm. long, obtuse, puberulent or glabrate.

### 2. MANETTIA L.

**Manettia canescens** Schum. in Mart. Fl. Bras. 6[6]: 178. 1889.

Mount Guayrapata, *Spruce 5438* (B, G, type collection; photo. of type, ex Herb. Berol., in F).

Leaves ovate-lanceolate, scaberulous above, densely tomentose beneath, attenuate-acuminate, acute at the base, the margins revolute; cymes 2–3-flowered; calyx lobes 4, subulate; corolla 5–6 mm. long; capsule canescent-pubescent.

**Manettia echitidea** Standl. Field Mus. Bot. 4: 276. 1929.

Malchinguí to Pomasqui, Prov. Pichincha, 3,000–3,600 m., *Hitchcock 20880* (W, Y). Also in Colombia.

Stems sparsely villous; leaves petiolate, lanceolate or ovate-lanceolate, 4.5–8 cm. long, 1.5–3 cm. wide, long-acuminate, at the base acute or abruptly contracted and long-decurrent, sparsely white-pilose beneath; flowers axillary, solitary or fasciculate; calyx lobes 8, linear or lance-oblong, 2–3 mm. long, recurved; corolla villous, the tube green, 8 mm. long, the lobes oblong-ovate, white, spreading, 5 mm. long.

**Manettia evenia** Sprague, Bull. Herb. Boiss. II. 5: 835. 1905.

Type from Pichincha, at 3,650 m., *Jameson 74*. Sprague reports also *Jameson 352*, "in valle Lloense."

Leaves ovate, obtusely acuminate, rounded at the base, 2–4.5 cm. long, 1–1.7 cm. wide, coriaceous, glabrous above, puberulent beneath; cymes 3-many-flowered; calyx lobes 4, ovate-deltoid, 2 mm. long; corolla minutely puberulent, the tube 6–7.5 mm. long, the lobes 3–3.5 mm. long.

**Manettia flexilis** Brandeg. Univ. Calif. Publ. Bot. 6: 196. 1915.

Chimborazo, at 900 m., *Spruce 6185* (ex Wernham, Gen. Manettia 29. 1919). Type from Mexico; also in Guatemala.

Leaves ovate or lance-ovate, 3–7 cm. long, 1–3 cm. wide, acute or long-attenuate, at the base acute or obtuse, glabrous above or nearly so, puberulent and short-pilose beneath; calyx lobes 4, linear to lance-ovate, 1.5–4 mm. long; corolla rose-colored, glabrous or sparsely pilose outside, the tube 6–7 mm. long, the lobes 2–3 mm. long.

To the present writer the occurrence of this Mexican and Central American species in Ecuador seems very improbable.

**Manettia Holwayi**, sp. nov.—Scandens, ramis ochraceis nitidis, novellis pilis gracilibus pallidis villosis; stipulae triangulares obtusae 2–3 mm. longae dentatae saepe recurvae; petiolus 3–6 mm. longus dense villosulus; lamina subcoriacea, elliptico-oblonga vel oblongo-ovata, 3–6.5 cm. longa, 1.5–3.3 cm. lata, obtusa vel acuta, basi obtusa vel subrotundata, supra cinereo-viridis, scaberula, nervis subimpressis, subtus pallidior, ubique dense velutino-pilosula, costa gracili elevata, nervis lateralibus utroque latere c. 7, angulo acuto adscendentibus, leviter arcuatis, margine subrevoluto; flores sessiles vel pedicellati subcapitati, capitulis densis multifloris 1–1.5 cm. latis axillaribus et terminalibus, sessilibus vel breviter pedunculatis, pedicellis dense villosis; hypanthium dense albo-villosum; calycis lobi 4 ovati vel lanceolati acuminati 3–4 mm. longi villosuli; corolla extus glabra 7–9 mm. longa, tubo crasso fauce 2.5 mm. lato, lobis ovatis obtusis 2.5 mm. longis intus glabris.—Ecuador: Huigra, Prov. Chimborazo, August 4, 1920, *E. W. D. and Mary M. Holway 941* (U. S. Nat. Herb. No. 1,050,995, type).

**Manettia Lobbii** Wernham, Gen. Manettia 26. 1919.

Type, *Lobb 97*, ascribed to Colombia, but probably from Ecuador. In valle Lloensi, 2,400 m., *Jameson 352* in part (G). Baños, Prov. Tungurahua, 1,800 m., *Heilborn 385* (F, S).

Leaves thick, elliptic, acuminate, glabrous, 3–5 cm. long, the lateral nerves obsolete, the margin revolute; calyx lobes 4, ovate-lanceolate, acute, 2 mm. long; hypanthium glabrous; corolla glabrous outside, the tube 7 mm. long, the limb 6–7 mm. broad.

**Manettia pichinchensis** Wernham, Gen. Manettia 25. 1919.

Mount Pichincha, at 3,000–3,600 m., *Couthouy* (G, type collection); *Holmgren 279* (F, S); at 3,000–3,200 m., *Lehmann 495a* (W); at 3,600 m., *Jameson* (G); at 3,900 m., *Karsten* (L). "Quito,"

*Jameson* (L). Without locality, *Jameson* (F, W). Wernham reports also the following collections: *Fraser; Jameson 56, 152, 287; Lehmann 495; Hall 80.*

Leaves triangular-lanceolate, subcoriaceous, 1.5–2 cm. long, 4–9 mm. wide, acuminate, truncate or cordate at the base, glabrous above, grayish-tomentellous beneath, the margins revolute; calyx lobes 4, narrowly lanceolate, 2–3 mm. long; corolla glabrous outside, the tube 5–6 mm. long, the lobes 2–2.5 mm. long; capsule 5–6 mm. long, minutely puberulous.

**Manettia recurva** Sprague, Bull. Herb. Boiss. II. 5: 835. 1905.

Mount Tungurahua, at 3,300 m., *Spruce 5835* (G, type collection). Between Cuenca and Huigra, 2,700–3,000 m., *Hitchcock 21666* (W, Y).

Leaves ovate-oblong, obtuse, 1–2.4 cm. long, 5–10 mm. wide, recurved at the apex, acute at the base, glabrous, the margins revolute; calyx lobes 4, ovate, 2.5 mm. long; corolla pinkish, glabrous outside, the tube 5 mm. long, the lobes 2–3 mm. long; capsule 5 mm. long, sparsely puberulent.

**Manettia Teresitae**, sp. nov.—Herbacea scandens, ramis gracilibus subteretibus retrorso-puberulis, internodiis elongatis; stipulae latissimae truncatae 0.8 mm. longae breviter fimbriato-ciliatae; petiolus gracilis 5–12 mm. longus puberulus; lamina late elliptica vel ovato-elliptica, 3–5.5 cm. longa, 1.5–3.5 cm. lata, herbacea, apice acuminata vel subrotundata et abrupte acuminata, acumine triangulari acuminato, basi acuta vel obtusa, interdum decurrens, supra viridis, sparse minuteque adpresso-pilosula vel glabrata, nervis non elevatis, subtus vix pallidior, praesertim ad nervos minute sparseque adpresso-pilosula, costa gracili elevata, nervis lateralibus utroque latere c. 6, gracilibus, prominulis, angulo acuto adscendentibus, arcuatis; flores umbellati vulgo 1–2 cm. longe pedicellati, umbellis axillaribus plerumque longipedunculatis, pedicellis sparse puberulis; hypanthium ovale vel obovatum 3 mm. longum subdense cinereo-pilosulum; calycis tubus 1 mm. longus, lobis 8 lineari-attenuatis 3–5 mm. longis puberulis recurvis; corolla coccinea in alabastro 8 mm. longa pilosula; capsula obovoidea 8–9 mm. longa glabrata.—Ecuador: Teresita, 3 km. west of Bucay, Prov. Guayas, alt. 270 m., July 5–7, 1923, *A. S. Hitchcock 20508* (U. S. Nat. Herb. No. 1,195,938, type; duplicate in Y).

An ally of *M. coccinea* (Aubl.) Willd., but distinct in the copious pubescence and small corolla.

**Manettia Trianae** Wernham, Gen. Manettia 27. 1919.

Woods at the foot of Mount Tungurahua, *Spruce 5092* (G). Also in Colombia.

Leaves firm-chartaceous, subcarnose, elliptic-lanceolate, acuminate at each end, 4–6.5 cm. long, 1.7–2.5 cm. wide, glabrous; calyx

lobes 4, ovate-lanceolate, 2.5 mm. long; corolla glabrous outside, the tube 5 mm. long, the lobes 3 mm. long.

## 3. CINCHONA L.

After the genus *Coffea*, that produces the coffee of commerce, the most important group of the family Rubiaceae is the genus *Cinchona*. From the trees of this genus is obtained the drug quinine, which is used in medicine throughout the world. It is singularly appropriate that tropical America, in which the greatest plague is malaria, should have produced the best remedy for this malady. One who lives in a temperate climate can scarcely appreciate the importance of malaria in relationship to the population of the tropics.

In these regions almost every person sooner or later is stricken with malaria. Recovery, under proper treatment, may be rapid and more or less complete, but too often, especially among the poor, recovery is only partial, and it is followed by further attacks, that weaken the individual, with many attendant affections, and finally cause his death. The loss of efficiency due to malaria is incalculable. Probably no other discovery in medicine could produce so great a benefit to so large a number of persons as that of a preventive of this terrible disease.

Since Ecuador is the country from which the efficiency of cinchona bark as a remedy for malaria was first made known to the world, it is pertinent to give here a summary of its rather romantic history. The best account of the history of the drug is that given in a book entitled *Peruvian bark, a popular account of the introduction of Chinchona cultivation into British India*, published in 1880 by Clements R. Markham, who was instrumental in establishing the Cinchonas in cultivation in India and Ceylon. The following extract from that book is slightly condensed:

The aborigines of South America appear, except perhaps in one locality, to have been ignorant of the virtues of Peruvian bark. This sovereign remedy is absent in the wallets of itinerant doctors, whose *materia medica* has been handed down from father to son, since the days of the Incas. It is mentioned neither by the Inca Garcilasso de la Vega, nor by Acosta, in their lists of Indian medicines. It seems probable, nevertheless, that the Indians were aware of the virtues of Peruvian bark in the neighborhood of Loja, 230 miles south of Quito, where its use was first made known to Europeans; and the local name for the tree, *quina-quina*, "bark of bark," indicates that it was believed to possess some special medicinal properties. The Indians looked upon their conquerors with dislike and suspicion; it is improbable that they would be inclined to impart knowledge of

this nature to them; and the interval which elapsed between the discovery and settlement of the country and the first use of Peruvian bark by Europeans is thus easily accounted for.

La Condamine, Jussieu, and Ruiz, all believed that the Indians were aware of the medicinal qualities of Peruvian bark, and that they imparted their knowledge to the Spaniards. Humboldt and Ulloa were of an opposite opinion. The stories of its virtues having been discovered by watching the pumas or South American lions chewing the bark to cure their fevers, mentioned by Condamine; and of an Indian having found it out by drinking of the waters of a lake into which a cinchona tree had fallen, told by Geoffroy, are of modern and European origin.

The conquest and subsequent civil wars in Peru can not be said to have been finally concluded until the time of the Marquis de Cañete in 1560; and Jussieu reports that a Jesuit, who had a fever at Malacotas, was cured by Peruvian bark in 1600. M. de la Condamine also found a manuscript in a library of a convent at Loja, in which it was stated that the Europeans of the province used the bark at about the same time.

It may be added, however, that though the Indians were aware of the febrifuge qualities of this bark, they attached little importance to them, and this may be another reason for the lapse of time which occurred before the knowledge was imparted to the Spaniards. This indifference to, and in many cases even prejudice against, the use of Peruvian bark amongst the Indians, is very remarkable. Poeppig, writing in 1830, says that in the Peruvian province of Huánuco the people, who are much subject to tertian agues, have a strong repugnance to its use. The Indian thinks that the cold north alone permits the use of fever-bark; he considers it as very heating, and therefore an unfit remedy in complaints which he believes to arise from inflammation of the blood. Even in Guayaquil the prejudice against quinine used to be so strong that, when a physician administered it, he was obliged to call it by another name.

In 1638 the wife of Don Luis Gerónimo Fernández de Cabrera Bobadilla y Mendoza, fourth Count of Chinchón, and Viceroy of Peru, lay sick of an intermittent fever in the palace of Lima.

This lady's maiden name was Ana de Osorio, a daughter of the noble family, whose founder was created Marquis of Astorga by Henry IV, King of Castille. She was married at Madrid, on Sunday, the 12th of August, 1621, to the Count of Chinchón. Her husband, of an old Catalonian family, was the grandchild of the first Count by Beatriz de Bobadilla, the faithful friend and attendant of Queen Isabella. He was hereditary Alcaide of Segovia, Lord of the Castle of Chinchón near Madrid, and of eighteen towns in the kingdom of Toledo. In 1628 the Count was appointed Viceroy of Peru, and he and his Countess made their solemn entry into Lima on the 14th of January, 1629.

The great event of this viceroyalty was the cure of the Countess of Chinchón, in the year 1638, of a tertian fever by the use of Peruvian bark. The news of her illness at Lima reached Don Francisco López de Cañizares, the Corregidor of Loja, who had become acquainted with the febrifuge virtues of the bark. He sent a parcel of it to the Vice-Queen, and the new remedy, administered by her physician, Dr. Don Juan de Vega, effected a rapid and complete cure. It is known by tradition amongst the bark collectors that the particular species from which the bark was taken, which cured the Countess of Chinchón, was that known to them as *Cascarilla de Chahuarguera*. These trees are a variety of the *C. officinalis* of Linnaeus, many thousands of which are now growing in India.

Madame de Genlis wrote a short novel founded on the cure of the Countess of Chinchón, which she dedicated to the Comtesse de Choiseul. It is entitled *Zuma*, and though erroneous in every particular so far as all the facts are concerned, it yet proves the deep and general interest which attaches to the first introduction of *quina* bark into Europe by the Vice-Queen.

The Countess of Chinchón returned to Spain in the spring of 1640, bringing with her a supply of that precious *quina* bark which had worked so wonderful a cure upon herself, and the healing virtues of which she intended to distribute amongst the sick on her husband's estates. It thus gradually became known in Europe, and was most appropriately called Countess's powder (*Pulvis Comitissae*). By this name it was long known to druggists and in commerce. Dr. Juan de Vega, the learned physician of the Countess of Chinchón, followed his patient to Spain, bringing with him a quantity of *quina* bark, which he sold at Seville for 100 reals the pound. The bark continued to have the same high value and the same reputation, until the trees became scarce and the collectors began to adulterate it.

After their return from Peru, the Count and Countess usually resided at the Castle of Chinchón, built by the Count's father in 1590. The Countess administered Peruvian bark to the sufferers from tertian agues on her lord's estates, in the fertile but unhealthy vegas of the Tagus, the Jarama, and the Tajuña. She thus spread blessings around her, and her good deeds are even now remembered by the people of Chinchón and Colmenar, in local traditions.

In memory of the great service to humanity performed by the Countess of Chinchón, Linnaeus named the genus which yields Peruvian bark, *Chinchona*. Unfortunately the great botanist was misinformed as to the name of her whom he desired to honor. This is to be accounted for by his having received his knowledge of the Countess through a foreign, and not a Spanish source. Thus misled, Linnaeus spelt the word *Cinchona* (Gen. Pl. ed. 1742) and *Cinhona* (Gen. Pl. ed. 1767), omitting one or two letters. It was still more unlucky that Linnaeus died before the error was pointed out and corrected. This was done by the Spanish botanists Ruiz and Pavón, who landed

in Peru in 1778, the year of Linnaeus's death. They advocated the correct spelling, and their example was followed by Mutis and others.[1]

After the cure of the Countess of Chinchón, the Jesuits were the great promoters of the introduction of bark into Europe. In 1670 these fathers sent parcels of the powdered bark to Rome, whence it was distributed to members of the fraternity throughout Europe, by Cardinal de Lugo, and used for the cure of agues with great success. Hence the name of "Jesuits' bark," and "Cardinal's bark"; and it was a ludicrous result of its patronage by the Jesuits that its use should have been for a long time opposed by the Protestants, and favored by Roman Catholics. In 1679 Louis XIV bought the secret of preparing quinquina from Sir Robert Talbor, an English doctor, for 2,000 louis d'or, a large pension, and a title. From that time Peruvian bark seems to have been recognized as the most efficacious remedy for intermittent fevers.

However, a very strong prejudice was raised against it, which it took many years to conquer; and the controversies that arose on the subject, between learned doctors, were long and acrimonious. It remained a subject of controversy as late as 1714, when two Italian doctors, Ramazzini and Torti, held opposite views on the subject.

Whilst the inestimable value of Peruvian bark was gradually forcing conviction on the most bigoted medical conservatives of Europe, and whilst the number and efficacy of the cures effected by its means were bringing it into general use, and so consequently increasing the demand, it was long before any knowledge was obtained of the tree from which it was taken. In 1682 La Fontaine, at the solicitation of the Duchess of Bouillon, who had been cured of a dangerous fever by taking Peruvian bark, composed a poem in two cantos to celebrate its virtues; but the exquisite beauty of the leaves, and the delicious fragrance of the flowers of the quinquina-tree, with allusions to which he might have adorned his poem, were still unknown in Europe.

The first description of the quinquina-tree is due to that memorable French expedition to South America, to which all branches of science owe so much. Its members, MM. de la Condamine, Godin, Bouguer, and the botanist Joseph de Jussieu, sailed from Rochelle on the 16th of May, 1735, to measure an arc of the meridian near Quito, and thus determine the shape of the earth. After a residence at Quito, Jussieu set out for Loja, to examine the quinquina-tree, in March, 1739, and in 1743 La Condamine visited Loja, and stayed for some time at Malacotas, with a Spaniard whose chief source of income was the collection of bark. He obtained some young plants with the intention of taking them down the river Amazons to Cayenne, and thence transporting them to the Jardin des Plantes at Paris; but a wave washed over his little vessel near Pará, at the mouth

[1] According to the general rules regarding the spelling of generic names, the name is now written *Cinchona*.—P.C.S.

of the great river, and carried off the box in which he had preserved those plants for more than eight months.

Condamine described the quinquina-tree of Loja in the *Mémoires de l'Academie;* he was the first man of science who examined and described this important plant; and in 1742 Linnaeus established the genus *Cinchona,* in honor of the Countess Ana of Chinchón. He, however, only knew of two species, that of Loja, which was named *C. officinalis,* and the *C. caribaea,* since degraded to the medicinally worthless genus of *Exostema.*

For many years the quinquina-tree of Loja, the *C. officinalis* of Linnaeus, was the only species with which botanists were acquainted; and from 1640 to 1776 no other bark was met with in commerce than that which was exported from the Peruvian port of Payta, brought down from the forests in the neighborhood of Loja. The constant practice of improvidently felling the trees over so small an area for more than a century, without any cessation, inevitably led to their becoming very scarce, and threatened their eventual extinction. As early as 1735 Ulloa reported to the Spanish Government, that the habit of cutting down the trees in the forests of Loja, and afterwards barking them, without taking the precaution of planting others in their places, would undoubtedly cause their complete extirpation. "Though the trees are numerous," he added, "yet they have an end"; and he suggested that the Corregidor of Loja should be directed to appoint an overseer, whose duty it should be to examine the forests, and satisfy himself that a tree was planted in place of every one that was felled, on pain of a fine. This wise rule was never enforced, and sixty years afterwards Humboldt reported that 25,000 trees were destroyed in one year. Yet the Jesuits are said to have enforced it as a religious duty that, for every tree felled, the bark collector should plant a quincunx.

The measures adopted by the Spanish Government towards the end of the last century, in sending botanical expeditions to explore the cinchona forests in other parts of their vast South American possessions led to the discovery of additional valuable species, the introduction of their barks into commerce, and the reduction of the pressure on the Loja forests, which were thus relieved from being the sole source whence Peruvian bark could be supplied to the world.

The region of cinchona trees extends from 19° S. latitude, where Weddell found *C. australis,* to 10° N., following the almost semicircular curve of the cordillera of the Andes, over at least 1,500 miles of latitude. They flourish in a cool and equable temperature, on the slopes and in the valleys and ravines of the mountains, surrounded by the most majestic scenery, never descending below an elevation of 2500, and ascending as high as 9000 feet above the sea. Within these limits their usual companions are tree-ferns, Melastomaceae, arborescent passion-flowers, and allied genera of cinchonaceous plants. Below them are forests abounding in palms and bamboos, above their highest alpine limits are a few lowly alpine shrubs. But within this

wide zone grow many species of Cinchonas, each within its own narrower belt as regards elevation above the sea, some yielding the inestimable bark, and others commercially worthless.

Thus, to give a geographical summary of the cinchona region, beginning from the south, it commences in the Bolivian province of Cochabamba in 19° S., passes through the Yungas of La Paz, Larecaja, Caupolicán, Coroico, and Muñecas, into the Peruvian province of Carabaya; thence through the Peruvian forests, on the eastern slopes of the Andes, of Marcapata, Paucartambo, Santa Ana, Huanta, and Uchupampa, to Huánuco and Huamalies, where the gray bark is found. It then continues through Jaen, to the forests near Loja and Cuenca, and on the western slopes of Chimborazo. It begins again in latitude 1° 51′ N. at Almaguer, passes through the province of Popayán, and along the slopes of the Andes of Quindío, until it reaches its extreme northern limit on the wooded heights of Mérida and Santa Marta.

The Cinchonas, when in good soil and under other favorable circumstances, become large forest trees; on higher elevations, and when crowded, and growing in rocky ground, they frequently run up to great heights without a branch; and at the upper limit of their zone they become mere shrubs. The leaves are of a great variety of shapes and sizes, but in most of the finest species they are lanceolate, with a shining surface of bright green, traversed by crimson veins, and petioles of the same color. The flowers are very small, but hang in clustering panicles, like lilacs, generally of a deep roseate color, paler near the stalk, dark crimson within the tube, with white curly hairs bordering the laciniae of the corolla. The flowers of *C. micrantha* are entirely white. They send forth a delicious fragrance which scents the air in their vicinity.

The region around Loja, on the southern frontier of the modern republic of Ecuador, is the original home of the cinchona, and nearly in the center of its latitudinal range of growth. On the lofty grass-covered slopes of the Andes, around the little town of Loja, and in the sheltered ravines and dense forests, those precious trees were found which first made known to the world the healing virtues of Peruvian bark. They were most plentifully met with in the forests of Uritusinga, Rumisitana, Cajanuma, Boquerón, Villonaco, and Monje, all within short distances of Loja.

Linnaeus named these trees *Cinchona officinalis;* but, when Humboldt and Bonpland examined them, the discovery of other species yielding medicinal bark induced them to rechristen this species after the distinguished Frenchman who had originally described them, *Cinchona Condaminea.* Humboldt says that they grow on mica slate and gneiss, from 6000 to 8000 feet above the sea, with a mean temperature between 60 and 65° Fahr. In his time the tree was cut down in its first flowering season, or in the fourth or seventh of its age, according as it had sprung from a vigorous root-shoot, or from a seed. He describes the luxuriance of the vegetation to be such that the younger trees, only six inches in diameter, often attain from fifty-three to

sixty-four English feet in height. "This beautiful tree," he continues, "which is adorned with leaves above five inches long and two broad, growing in dense forests, seems always to aspire to rise above its neighbors. As its upper branches wave to and fro in the wind, their red and shining foliage produces a strange and peculiar effect, recognizable from a great distance." It varies much in the shape of its leaves, according to the altitude at which it grows, and bark collectors themselves would be deceived if they did not know the tree by the glands, so long unobserved by botanists. The *C. Condaminea* described by Humboldt is the same as the *C. uritusinga* of Pavón. It once yielded great quantities of thick trunk bark, but, owing to reckless felling through a course of years, it is now almost exterminated, and its bark is rarely met with in commerce. The distinguished botanist Don Francisco Caldas examined the cinchona forests of Loja after Humboldt, between 1803 and 1809. He says that the famous quina-tree of Loja grows in the forests of Uritusinga and Cajanuma, at a height of from 6200 to 8200 feet above the sea, in a temperature of 41 to 72° Fahr.; but that it is only found between the rivers Zamora and Cachiyacu. He describes the tree as from thirty to forty-eight feet high, with three or more stems growing from the same root; the leaves as lanceolate, shining on both sides, with veins a rosy color, a short and tender pubescence on the under side when young, and when past maturity a bright scarlet color; the bark black when exposed to the sun and wind, a brownish color when closed in by other trees, and always covered with lichens; and the rock on which it grows a micaceous schist.

The Spanish botanists Ruiz and Pavón also examined the cinchona-trees of Loja; and the latter described two species, *C. uritusinga*, named from the mountain on which it was once most abundant, and *C. chahuarguera*, so called from a fancied resemblance of the bark to a pair of breeches (*huara* in Quichua) made from the fiber of the American aloe (*chahuar*). To these the botanist Tafalla added *C. crispa*. These three species are all included in Humboldt's *C. Condaminea*, which is readily known by the little pits, bordered with hairs, at the axils of the veins on the under side of the leaf. It would appear that at one period of growth these little pits are wanting but when the plant is in full vigor they are markedly prominent. *C. chahuarguera* is described by Pavón as growing from eighteen to twenty-four feet in height; although now the trees which yield the Loja bark of commerce do not attain a height of more than four to nine feet. It is met with on the grassy open crests of mountain ridges, in light sandy soil interspersed with rocks, amongst shrubs and young plants. The barks of Loja were called *crown barks*, because they were reserved for the exclusive use of the royal pharmacy at Madrid; and they originally sold at Panama for five and six dollars, and at Seville for twelve dollars the pound; but in later times they were much adulterated, and the price fell to one dollar the pound.

The *C. chahuarguera* is the *rusty crown bark* of commerce, and the *C. crispa* is the *quina fina de Loja* or *crespilla negra* of the natives.

With this *rusty crown bark* are mixed larger quills particularly rich in the alkaloid called cinchonidine. It is said that there is a great difference in the bark, according as it is grown on the sides of mountains most exposed to the morning or evening sun; and its position is believed to have a great influence on the quality of its alkaloids. The usual yield of the large quills is 3.5 to 3.6 per cent.

The bark collectors of Loja are said to show some little forethought, a quality which is entirely wanting to most of their fraternity. To save the trees they occasionally cut off the whole of the bark, with the exception of one long strip, which gradually replaces its loss; and the second cutting is called *cascarilla resecada.* This practice was in use in the days of the botanist Ruiz, who protested against it, and declared that it was very injurious to the trees, many having been destroyed by it. Later accounts, however, show that the bark collectors of Loja are as thoughtlessly destructive as those in other parts of South America. They often pull up the roots, while the annual burning of the slopes, and the continual cropping of the young shoots by cattle, assist the work of destruction.

It is, therefore, well that the *C. chahuarguera* and *C. uritusinga,* the earliest known and among the most valuable of the cinchona-trees, should have been saved from extinction by timely introduction into India.

The species yielding "red bark," the richest and most important of all the Cinchonae, is found in the forests on the western slopes of Mount Chimborazo, along the banks of the rivers Chanchan, Chasuan, San Antonio, and their tributaries. So early as 1738 Condamine spoke of "red bark" (*cascarilla colorada*) as being of superior quality; and Pavón sent home specimens of the "red bark of Huaranda," and named the species *C. succirubra.* Much light was thrown upon the history of this valuable species by Dr. Spruce, when he penetrated into the forests to collect seeds and plants for transmission to India in 1860.

Though little was known of the tree until quite lately, there was never any doubt concerning the value of the bark. In 1779 a Spanish ship from Lima, bound to Cadiz, was captured off Lisbon by the *Hussar* frigate, and her cargo consisted chiefly of "red bark," part of which was imported into England. In 1785 and 1786 Ruiz states that the collectors began to gather the bark of *C. succirubra,* and sell it at Guayaquil, and from that time it continued to be found in the European markets. It contains a larger proportion of alkaloids than any other kind, chiefly cinchonidine. Mr. Howard has procured 8.5 per cent of alkaloids from a specimen of "red bark" from South America. A large supply of plants of this species is flourishing in India and Ceylon, and it has become a cultivated plant of great value and importance, with a much greater yield of total alkaloids than when in its wild state.

Because the supply of Cinchona bark for the extraction of quinine was not of dependable regularity, and because there was even a

possibility of the extinction of the trees as a result of careless cutting, it was determined to introduce the trees into parts of the East Indies, where it was believed conditions were suitable for their growth. They were planted first in Java, but partly because methods for their cultivation had not been perfected, and partly on account of the selection of poor varieties of the plants, the first attempts at cultivation there did not succeed.

In 1859 definite plans were made under the direction of the British government for establishing cinchona trees in the mountains of India. The best available authorities were selected to undertake the work, which was directed by Clements R. Markham. Plants and seeds were gathered in all the principal centers of production, from Bolivia to Colombia. As a result of the precautions taken, and after great labor in obtaining the seeds and plants, the various species of *Cinchona* were successfully established in the Nilgiri Hills and elsewhere.

Richard Spruce, who from his many years of botanical exploration along the Amazon and in the Andes was thoroughly familiar with vegetation of those regions, was entrusted with the collection of cinchona in the Chimborazo region. An account of his work is given in Markham's book already quoted, and a much fuller account in Spruce's *Notes of a botanist on the Amazon and Andes*. In his work Spruce was assisted by Robert Cross, who later obtained further material from the Loja region.

As a result of this undertaking of the British government, cinchona cultivation was quickly established in India, and the chief supply of the drug quinine now comes from the East Indies. Too late the South American governments realized the importance of forbidding the export of living plants and seeds, but it is doubtless quite as well that they did not attempt too soon to place an embargo upon their export. If they had done so, seeds or even plants would have been smuggled abroad sooner or later. Moreover, the drug quinine is such an essential one in the alleviation of human suffering that its widest possible distribution is earnestly to be desired.

The literature pertaining to cinchona is an exceedingly extensive one, for the subject has occupied the attention of many pharmacists and botanists for two hundred years. In Markham's book thirty pages are devoted to a list of books and articles treating of the subject, and many more titles could be added.

Because of the great economic importance of the trees concerned, and especially because of the varying quinine content in the inhabit-

ants of the various regions, several botanists have devoted a great deal of time and hundreds of printed pages and plates to a discussion of the species of the genus. The result of their work has been the description of a great number of so-called species, based on characters that certainly would not be considered valid or important in other genera of the Rubiaceae. The writer has examined a large amount of herbarium material of the genus, as well as photographs of many of the types involved. He is quite unable to discover any conservative basis for recognizing the many species to which names have been given, and he believes that these names relate to variable races of a few not very clearly marked species which may be recognized for botanical convenience. The mere fact that the variations of these races are important from the standpoint of the pharmacist does not justify their recognition, if such were possible, as species in the ordinary sense of that term.

**Cinchona Humboldtiana** Lamb. Ill. Cinch. 7. 1821. *C. villosa* Pavón ex Lamb., loc. cit., as syn. *C. conglomerata* Pavón ex Howard, Ill. Nueva Quinol. Pav. *pl. 15*. 1862.

Andes of Sigsig, 1,600–1,800 m., *Lehmann 6608* (K). Reported from Loja. Also in Peru and Bolivia.

Branchlets villous; leaves lanceolate to elliptic-oblong, acute at each end, finally glabrate above, densely villous beneath; panicles dense, villous; calyx teeth very short, acute; capsule oblong, 2–2.5 cm. long, villous or glabrate.

"Cascarilla colorada."

**Cinchona micrantha** R. & P. Fl. Peruv. 2: 52. *pl. 194*. 1799.

Reported from southern Ecuador. Also in Peru and Bolivia.

Branchlets sericeous or glabrate; stipules ovate, obtuse, glabrous; leaves petiolate, oval, obovate, or rounded, obtuse to rounded at the apex, acute to rounded at the base, large, coriaceous, nearly glabrous but usually pilose beneath along the costa; inflorescence paniculate, terminal, large, open, many-flowered, leafy, minutely tomentose; calyx minute, 5-dentate, the teeth acute; corolla pink, about 6 mm. long, densely tomentulose, the lobes much shorter than the tube, villous within; capsule oblong, acute, about 1.5 cm. long, striate.

It is doubtful whether this is more than an extreme form of *C. pubescens*, since the size of the corolla is exceedingly variable in the forms referred to that species.

**Cinchona officinalis** L. Sp. Pl. 172. 1753 (collected at Loja by Condamine). *C. lancifolia* Mutis, "Periódico de Santa Fe," 465. 1793. *C. glabra* Ruiz, Quinol. 64. 1792. *C. nitida* R. & P. Fl. Peruv. 2: 50. *pl. 191*. 1799. *C. lanceolata* R. & P. Fl. Peruv. 51. 1799. *C.*

*angustifolia* Ruiz, Quinol. Suppl. 14. 1801. *C. Condaminea* H. & B. Pl. Aequin. 1: 33. *pl. 10.* 1808 (described from Loja and Ayavaca). *C. colorata* Lamb. Bull. Pharm. 294. 1810. *C. Condaminea β lanceolata* Lamb. Ill. Cinch. 2. 1821. *C. stupea* Pavón ex Lamb., loc. cit., as syn.; Lindl. Fl. Med. 416. 1838. *C. academica* Guib. Drog. Simpl. 3: 98. 1822. *C. macrocalyx* DC. Bibl. Univ. 41: 150. 1829. *C. Condaminea β chahuarguera* DC. Prodr. 4: 352. 1830. *C. chahuarguera* Pavón ex DC., loc. cit., as syn. (type from Ecuador). *C. macrocalyx β obtusifolia* DC. Prodr. 4: 353. 1830. *C. obtusifolia* Pavón ex DC., loc. cit., as syn. 1830. *C. macrocalyx γ lucumaefolia* DC., loc. cit. 1830. *C. lucumaefolia* Pavón ex DC., loc. cit., as syn. 1830. *C. calisaya* Wedd. Ann. Sci. Nat. III. 10: 6. 1848. *C. amygdalifolia* Wedd., loc. cit. *C. calisaya β Josephiana* Wedd. Ann. Sci. Nat. III. 11: 269. 1849. *C. Condaminea α Condaminea vera* Wedd., loc. cit. *C. Condaminea β Candollei* Wedd., loc. cit. *C. Condaminea γ lucumaefolia* Wedd., loc. cit. *C. Condaminea δ lancifolia* Wedd., loc. cit. *C. crispa* Tafalla ex Howard, Nueva Quinol. Pav. *pl. 2.* 1862. *C. palton* Pavón ex Howard, op. cit. *pl. 13.* 1862. *C. heterophylla* Pavón ex Howard, op. cit. *pl. 18.* 1862. *C. violacea* et *C. suberosa* Pavón ex Howard, op. cit. 1862. *C. uritusinga* Pavón ex Howard, op. cit. *pl. 19.* 1862. *C. calisaya* var. *rugosa* Miq. Ann. Mus. Lugd. Bat. 4. 1868–69. *C. officinalis* var. *uritusinga* Howard, Rept. Intern. Bot. Congr. 201. 1866. *C. officinalis* var. *Condaminea* Howard, op. cit. 202. 1866. *C. officinalis* var. *Bonplandiana* Howard, op. cit. 203. 1866. *C. officinalis* var. *crispa* Howard, op. cit. 203. 1866.

Without locality, *Humboldt & Bonpland* (F, photo. of type? of *Cinchona Condaminea* ex Herb. Berol.). Without locality, *Pavón,* (F, photo. and fragm. of type of *C. chahuarguera,* ex Herb. Berol.). Loja, *Jameson 10* (G). Without locality, *Jameson* (W). Cerro de Uritusinga, near Loja, 2,400 m., October, 1835, *Jameson* (P). Loja, *Rose, Pachano & Rose 23299* (F, W, G, Y), *23300* (F, G, W, Y). Between Loja and Portovelo, *Rose, Pachano & Rose 23319* (G, W, Y). Pangar, 2,500–2,900 m., *Lehmann 5453* (F, K). San Agustín, Loja, 2,000–2,500 m., *Lehmann 7927* (K). Without locality, *Lobb 301* (K). Also in Colombia, Peru, and Bolivia.

A large or medium-sized tree, sometimes 24 m. high, with a trunk 1–1.5 m. in diameter, the bark rugose, the branchlets strigillose-pilosulous; stipules free, lanceolate or oblong, acute or obtuse, glabrous, deciduous; leaves petioled, lanceolate to ovate, small, acute to acuminate or obtuse, at the base rounded to attenuate, subcoriaceous, glabrous above, beneath glabrous, or puberulent or hispidulous, especially on the nerves, commonly about 10 cm. long and 4 cm. wide, often scrobiculate beneath; inflorescences terminal, many-flowered, dense, leafy, cymose-paniculate; hypanthium strigose; calyx reddish, glabrous or nearly so, the teeth triangular, acute; corolla pink or red, sericeous, the tube about 1 cm. long, the 5 lobes ovate, acute; capsule oblong, striate-costate, usually 1.5–2 cm. long, glabrate.

"Cascarilla fina de Uritusinga," "cascarilla colorada del rey," "cascarilla amarilla del rey," "cascarilla blanca pata de gallinazo," "cascarilla crespilla negra mala," "cascarilla serrana acanelada," "quina negra," "quina negrilla," "cascarilla hoja de lucma," "quinquina payama," "original Loxa crownbark," "rusty crownbark."

**Cinchona pubescens** Vahl, Skrivt. Naturh. Selsk. 1: 19. 1790. *C. hirsuta* R. & P. Fl. Peruv. 2: 51. *pl. 192.* 1799. *C. purpurea* R. & P., op. cit. 52. *pl. 193.* 1799. *C. ovata* R. & P., op. cit. 52. *pl. 195.* 1799. *C. cordifolia* Mutis ex Humb. Ges. Naturf. Freund. Berlin Mag. 1: 117. 1807. *C. scrobiculata* H. & B. Pl. Aequin. 1: 165. *pl. 47.* 1808. *C. rotundifolia* Pavón ex Lamb. Ill. Cinch. 5. 1821 (type collected at Loja by Pavón). *C. Mutisii* Lamb., op. cit. 9. 1821 (type collected at Loja by Pavón). *C. microphylla* Mutis ex Lamb., loc. cit., as syn. 1821. *C. quercifolia* Pavón ex Lamb., loc. cit., as syn. 1821. *C. pelalba* Pavón ex DC. Bibl. Univ. 41: 152. 1829. *C. discolor* Hayne, Arzneigew. 14: sub *pl. 14.* 1846. *C. Delondriana* Wedd. Ann. Sci. Nat. III. 10: 7. 1848. *C. rufinervis* Wedd., op. cit. 8. 1848. *C. scrobiculata β Delondriana* Wedd. Ann. Sci. Nat. III. 11: 270. 1849. *C. pubescens β purpurea* Wedd., loc. cit. 1849. *C. cordifolia β rotundifolia* Wedd., loc. cit. 1849. *C. Mutisii α microphylla* Wedd., loc. cit. 1849. *C. Mutisii β crispa* Wedd., loc. cit. 1849, nomen nudum. *C. succirubra* Pavón ex Klotzsch, Abh. Akad. Berl. 1857: 60. 1858. *C. erythrantha* Pavón ex Howard, Nueva Quinol. Pav. *pl. 12.* 1862. *C. lutea* Pavón ex Howard, Nueva Quinol. Pav. *pl. 14.* 1862. *C. obovata* Pavón ex Howard, op. cit. *pl. 18.* 1862. *C. decurrentifolia* Pavón ex Howard, op. cit. *pl. 23.* 1862. *C. peruviana* Howard, op. cit. *pl. 27.* 1862. *C. viridiflora* Pavón ex Howard, op. cit. 1862. *C. Howardiana* Kuntze, Monogr. Cinch. 30. 1878.

Western slopes of the Andes of Zaruma, 1,800–2,000 m., *Lehmann 7925* (F, K, W). Cuenca, 2,500–3,000 m., *Lehmann 4593* (F, K, W). Chiguinda, 1,600–2,000 m., *Lehmann 6495* (F, K). San Cristóbal, western Andes of Guaranda, 1,400–2,000 m., *Lehmann 8467* (F). Western Andes of Cuenca, 2,300–2,800 m., *Lehmann 4920* (F). Huigra, *Rose & Rose 22586* (F, G, W, Y), *22481* (F, G, W, Y). Region of Cuenca, *Jameson* (P). Chimborazo, 1,800 m., *André K528* (F, G, K, Y). Portovelo, *Rose & Rose 23428* (W). Without locality, *Jameson 16* (Y); *Jameson* (W). Cuenca, 2,800–3,000 m., *Lehmann 6605* (K). Río Pastaza, 1,500 m., *Lehmann 445* (L). Also in Colombia, and extending southward to Bolivia.

A medium-sized tree, the trunk usually about 30 cm. in diameter, the branchlets variously pubescent; stipules large, free, ovate, obtuse or acute, caducous, sericeous or almost glabrous; leaves petioled, usually orbicular to broadly ovate, large, rounded to acute at the apex, at the base cordate to acute, often decurrent, usually glabrous above but sometimes pubescent, beneath densely pilose to nearly glabrous, often scrobiculate; inflorescence terminal, paniculate, large, leafy, many-flowered, open, the flowers subsessile; hypanthium seri-

ceous; calyx 5-dentate, minutely sericeous or tomentulose; corolla red or pink, sericeous, the tube usually about 1 cm. long, the lobes lanceolate, 5–7 mm. long, villous within; capsule lanceolate or oblong, striate-costate, glabrate, usually 1.5–2.5 cm. long.

"Cascarilla amarga," "cascarilla gallinazo," "cascarilla varona" (Lehmann).

### 4. MACROCNEMUM L.

**Macrocnemum cuencanum,** nom. nov. *Cinchona ovalifolia* HBK. Nov. Gen. & Sp. 3: 403. 1820, non Mutis, 1807. *C. Humboldtiana* R. & S. Syst. Veg. 5: 13. 1819, non Lamb. 1797. *Lasionema Humboldtianum* Wedd. Hist. Quinquin. 99. 1849. *Macrocnemum Humboldtianum* Wedd. Ann. Sci. Nat. IV. 1: 76. 1854.

Type from Cuenca.

A small tree; leaves ovate-lanceolate or obovate, acutish, somewhat attenuate at the base, glabrous above, tomentose-hirsute beneath; calyx lobes triangular, acute; corolla lobes valvate; capsule ovate-oblong.

### 5. LADENBERGIA Klotzsch

**Ladenbergia crassifolia** (Pavón), comb. nov. *Cinchona crassifolia* Pavón ex DC. Bibl. Univ. 41: 150. 1829; Prodr. 4: 354. 1830. *Cascarilla calyptrata* Wedd. Ann. Sci. Nat. III. 10: 13. 1848. *Buena crassifolia* Wedd. Journ. Linn. Soc. 11: 187. 1869.

Described from Quito and Loja.

Leaves oblong, subobtuse, attenuate at the base, coriaceous, glabrous, when young villous beneath in the axils of the nerves; stipules united into a cap; flowers in terminal trichotomous few-flowered corymbs; calyx lobes triangular-lanceolate; capsules oval-oblong, 3.5 cm. long, 12 mm. broad.

**Ladenbergia macrocarpa** (Vahl) Klotzsch in Hayne, Arzneigew. 14: sub *pl. 15.* 1846. *Cinchona macrocarpa* Vahl, Skrivt. Naturh. Selsk. 1: 20. 1790. *Cascarilla macrocarpa* Wedd. Ann. Sci. Nat. III. 10: 13. 1848. *Cinchona magniflora* Pavón ex DC. Prodr. 4: 354. 1830, as syn.

Reported from Loja and Cuenca, *Pavón.* Also in Colombia and Peru.

A tree, the branchlets ferruginous-tomentose; stipules united into a caducous cap, tomentose; leaves petiolate, oval-elliptic or broadly oval, large, coriaceous, obtuse, at the base usually rounded or subcordate, sometimes acute, glabrous above, ferruginous-tomentose beneath or glabrate; panicles terminal, few-flowered, the flowers sessile or nearly so; calyx tomentose, the teeth short, obtuse; corolla densely sericeous, 5.5 cm. long, the 5–6 lobes about half as long as the tube; capsule oblong-clavate, 5–8 cm. long, tomentose or glabrate.

**Ladenbergia magnifolia** (R. & P.) Klotzsch in Hayne, Arzneigew. 14: sub *pl. 15.* 1846. *Cinchona magnifolia* R. & P. Fl. Peruv. 2:

53. *pl. 196.* 1799. *Cascarilla magnifolia* Wedd. Ann. Sci. Nat. III. 10: 10. 1848. *Buena magnifolia* Wedd. Journ. Linn. Soc. 11: 186. 1869.

This tree doubtless grows in Ecuador, but I have seen no specimens. The species is known from Colombia, Peru, and Bolivia.

**Ladenbergia Pavonii** (Lamb.), comb. nov. *Cinchona Pavonii* Lamb. Ill. Cinch. 8. 1821. *C. cava* Pavón ex Lamb., loc. cit., as syn. *Ladenbergia cava* Klotzsch in Hayne, Arzneigew. 14: sub *pl. 15.* 1846. *Cascarilla Pavonii* Wedd. Ann. Sci. Nat. III. 10: 11. 1848. *Buena Pavonii* Wedd. Journ. Linn. Soc. 11: 186. 1869.

Type from the forests of Loja, *Pavón.*

Branchlets ferruginous-tomentose; stipules free or short-connate; leaves ovate or orbicular, obtuse, at the base obtuse or cordate, subcoriaceous, glabrate above, ferruginous-tomentose beneath; panicles many-flowered, dense, tomentose; calyx large, obsoletely denticulate; corolla large, sericeous, the lobes ovate-oblong, obtuse, fleshy; capsule terete, "as large as a finger."

**Ladenbergia Riveroana** (Wedd.), comb. nov. *Cinchona oblongifolia* Lamb. Ill. Cinchon. 12. 1821, non Mutis, 1807. *Cascarilla Riveroana* Wedd. Ann. Sci. Nat. III. 10: 11. 1848. *Buena Riveroana* Wedd. Journ. Linn. Soc. 11: 186. 1869. *Remijia Riveroana* Flueck. Chinarinde 17. 1883.

Type from forests of the mountains of Loja, *Pavón.*

Leaves oblong-lanceolate or ovate, acute at each end or rounded at the base, subcoriaceous, puberulent or glabrate above, pubescent-tomentose beneath; stipules free or nearly so; inflorescence corymbiform, scabrous-pilose; calyx teeth triangular-ovate; corolla pilose, the lobes linear; capsule linear-lanceolate, pubescent.

"Azahar macho," "azahar hembra." Weddell gives the type locality as "Peruvia," without indication of a specific locality or of the collector, but the plant is reported by other writers to have been collected in the Loja region by Pavón.

## 6. HILLIA Jacq.

**Hillia macrophylla,** sp. nov.—Frutex subramosus 3-metralis epiphyticus terrestrisque, ramulis crassis glabris, internodiis c. 5.5 cm. longis; stipulae deciduae ovali-ovatae vel ovato-oblongae, 3–3.5 cm. longae, apice rotundatae vel obtusae, ferrugineae; folia petiolata opposita, petiolo 1–1.5 cm. longo crasso glabro; lamina crasse membranacea, elliptico-ovata vel late elliptica, 10–19 cm. longa, 6–10 cm. lata, abrupte breviterque acuminata, acumine anguste triangulari c. 1 cm. longo obtuso, basi obtusa vel acuta, glabra, supra fusca, nervis subimpressis, subtus paullo pallidior, costa crassiuscula elevata, nervis lateralibus utroque latere c. 7, gracilibus, prominentibus, angulo acuto adscendentibus, subarcuatis, prope marginem con-

junctis, nervulis inconspicuis laxissime reticulatis, margine plano; flores terminales pauci odorati sessiles; hypanthium crasse cylindricum 6–7 mm. longum glabrum; calyx non visus; corolla alba extus glabra, tubo gracili 9.5 cm. longo gracili basi 2.5 mm. lato, superne sensim dilatato, ore 1 cm. lato, lobis 5 patentibus vel reflexis linearilanceolatis longe attenuatis 3.5–4 cm. longis; capsula 9.5 cm. longa, valvis 2 cm. latis.—Ecuador: Base of Mt. Chimborazo, alt. 900 m., June, 1860, *R. Spruce 6186* (Herb. Kew., type; photo. in herb. Field Mus.). Fruit was collected from the same plant in August, 1860.

From *H. parasitica* Jacq. this species is easily differentiated by the very large leaves with conspicuous nerves, and by the larger flowers.

**Hillia parasitica** Jacq. Enum. Pl. Carib. 18. 1760.

Andes, *Spruce 5079* (G). Also in Brazil, the West Indies, Mexico, and elsewhere in tropical America.

A glabrous epiphytic shrub; leaves petiolate, elliptic, 6–14 cm. long, cuspidate-acuminate; flowers terminal, solitary, sessile; calyx 6-parted or absent; corolla white, the slender tube 6–10 cm. long.

## 7. COUTAREA Aubl.

**Coutarea Andrei,** sp. nov.—Ramuli rigidi subteretes ochracei rimosi glabri, internodiis brevibus; stipulae ovato-triangulares acutae 2 mm. longae; petiolus glaber 1–1.5 mm. longus; lamina ovato-elliptica vel late ovata, 1.5–3 cm. longa, 1–1.6 cm. lata, obtusa, basi obtusa vel subacuta, membranacea, glabra, fere concolor, costa subtus prominente gracili pallida, nervis lateralibus utroque latere c. 5, adscendentibus, arcuatis, remote a margine conjunctis; inflorescentia terminalis 1–4-flora umbelliformis, pedicellis 2–3 mm. longis glabris; hypanthium obovatum 3 mm. longum glabrum; calyx 5-partitus, laciniis lanceolato-subulatis inaequalibus 3–6 mm. longis ciliolatis; corolla tubulosa 17–20 mm. longa glabra, tubo angulato superne paullo dilatato, fauce 3–4 mm. lato, lobis erectis late ovatis obtusis fere 4 mm. longis; filamenta gracilia glabra, antheris linearibus rectis 7 mm. longis.—Ecuador: Chuquiribamba, November 16, 1876, *E. André 4443* (Herb. Field Mus. No. 533,792, type; duplicates in K and Y).

In its small flowers, narrow corolla, and small leaves this is quite distinct from all other members of the genus.

**Coutarea Lindeniana** Baill. Adansonia 12: 300. 1879.

Near Oña, *Jameson* (K). Also in Colombia and Venezuela.

A small tree; leaves elliptic or oblong-elliptic, petioled, acuminate, glabrous or sometimes velvety-pubescent beneath; cymes dense, many-flowered; calyx lobes elongate, linear-subulate; corolla light purple (according to Jameson), 2.5–3.5 cm. long.

Jameson describes the plant as "a very elegant shrub."

## 8. CHIMARRHIS Jacq.

**Chimarrhis dioica** Schum. & Krause, Bot. Jahrb. Engler 40: 312. 1908.

Type from Río Vargro, at 3,400–3,600 m., *Lehmann 7718* (F, photo. of type ex Herb. Berol.). Also in Peru.

A shrub 3 m. high; leaves short-petiolate, oblong or oblong-elliptic, 8–20 cm. long, 4–12 cm. wide, acuminate, at the base acute, subtomentose beneath, especially on the nerves, subcoriaceous; flowers dioecious, in terminal panicles 3–6 cm. long; calyx lobes ovate, acute; corolla yellowish green, rotate, 4–5 mm. long, glabrous; capsule subglobose, 3 mm. long.

## 9. CONDAMINEA DC.

**Condaminea breviflora** Standl. Field Mus. Bot. 4: 264. 1929.

Zamora, eastern slopes of the eastern Andes of Loja, 800–1,200 m., *Lehmann 5651* (F, type).

Glabrous; stipules 2–3 cm. long, bifid; leaves short-petiolate, obovate-oblong, 19–27 cm. long, abruptly short-acuminate, truncate or rounded at the base; corymbs terminal, trichotomous, long-pedunculate; hypanthium 6–7 mm. long, the calyx truncate, 4 mm. long; corolla tube 1 cm. long, the lobes oblong, 7 mm. long, obtuse; anthers exserted.

**Condaminea corymbosa** (R. & P.) DC. Prodr. 4: 402. 1830. *Macrocnemum corymbosum* R. & P. Fl. Peruv. 2: 48. *pl. 189.* 1799.

Portovelo, *Rose & Rose 23426* (W). Widely distributed in South America, and in Panama.

A shrub or small tree, usually glabrous, with very large, oblong or obovate, usually sessile and clasping leaves; calyx 8 mm. long, truncate or irregularly dentate; corolla 2.5 cm. long; capsule bisulcate, about 17 mm. long.

## 10. RONDELETIA L.

**Rondeletia chimboracensis,** sp. nov.—Frutex tenuis multicaulis interdum 6-metralis, ramulis gracilibus subteretibus dense hirsutis, internodiis brevibus vel elongatis; stipulae persistentes 10–14 mm. longae, parte basali rotundata subscariosa hirsuta, abrupte in caudam lanceolato-linearem angustam longe attenuatam ciliatam desinente; folia breviter petiolata opposita, petiolo 5–7 mm. longo dense hirsuto; lamina crasse membranacea, lanceolato-oblonga vel lanceolata, rarius oblongo-elliptica, 6–11 cm. longa, 2–5 cm. lata, longissime acuminata, acumine angusto longe attenuato, basi acuta, supra viridis, dense pilis brevibus fulvis hirsuta, arcte bullulata, nervis nervulisque omnibus profunde impressis, subtus pallida, dense pilis patentibus et intertextis albidis hirsuta, costa gracili elevata, nervis lateralibus utroque latere c. 13, gracillimis, prominentibus, angulo angusto adscendentibus, arcuatis, prope marginem conjunctis, nervulis arcte reticulatis prominentibusque; inflorescentia terminalis

1.2–2 cm. longe pedunculata cymosa vel cymoso-paniculata laxe pauciflora, 3–5 cm. longa et aequilata, floribus plerumque secundis sessilibus vel brevissime pedicellatis, bracteis filiformibus vel linearibus 3–6 mm. longis hirtellis; hypanthium obovoideum 2 mm. longum densissime ochraceo-hispidulum; calyx 4-partitus, laciniis patentibus 2.5–3 mm. longis linearibus versus apicem longe attenuatis extus hispidulis; corolla extus dense albido-hirsuta, tubo albo 16 mm. longo gracili tereti, lobis 4 rubris rotundatis 3 mm. longis intus minute papillosis.—Ecuador: At the base of Mt. Chimborazo, alt. 900 m., July, 1860, *R. Spruce 6187* (Herb. Kew., type; photo. in herb. Field Mus.).

**Rondeletia cupreiflora** Schum. & Krause, Bot. Jahrb. Engler 40: 314. 1908.

Río Badcun, 2,000–2,500 m., *Lehmann 5448* (F). Also in Colombia.

A shrub or small tree 5 m. high; stipules triangular, acute, 5–6 mm. long; leaves oblong, 7–14 cm. long, acuminate, sparsely pilose beneath; flowers 4-parted, in corymbiform panicles; calyx lobes lance-subulate, nearly equaling the hypanthium; corolla copper-red, 20–23 mm. long, puberulent.

**Rondeletia trichotoma,** sp. nov.—Arbor tenuis subramosa 7.5 m. alta, ramulis gracilibus subteretibus vel in sicco compressis, brunneis, laxe cinereo-tomentosis vel glabratis, internodiis brevibus vel elongatis; stipulae e basi triangulari lineari-cuspidatae, 5 mm. longae, erectae, persistentes, tomentulosae vel glabratae; folia opposita, petiolo crassiusculo 3–5 mm. longo tomentuloso vel glabrato; lamina elliptico-oblonga vel lanceolato-oblonga, 6–8.5 cm. longa, 2–3 cm. lata, longiacuminata, basi acuta vel attenuata, crasse membranacea, supra viridis, ad nervos arachnoideo-tomentosa vel fere glabra, nervis inconspicuis, subtus pallidior, ad nervos cinereo-tomentosa, costa nervisque gracilibus prominentibus, nervis lateralibus utroque latere c. 9, angulo acuto adscendentibus, leviter arcuatis, prope marginem conjunctis, nervulis vix prominentibus arcte reticulatis; flores tetrameri in paniculas terminales trichotomas c. 4 cm. longas et 8 cm. latas 5 cm. longe pedunculatas dispositi, cymulis paucis dense multifloris, floribus sessilibus vel usque ad 3 mm. longe pedicellatis, bracteis inferioribus linearibus 1 cm. longis, superioribus c. 5 mm. longis; hypanthium oblongum fere 3 mm. longum dense albido-tomentosum; calyx 4-partitus, lobis 2.5–5 mm. longis linearibus vel anguste oblongis obtusis, extus sparse tomentulosis, intus glabris; corolla rubra extus sparse minuteque tomentulosa, tubo gracili 12 mm. longo superne paullo ampliato, lobis 4 rotundatis 2 mm. longis crispulis intus glabris.—Ecuador: In the Andes at the foot of Mount Tungurahua, alt. 1,950 m., in 1857, *R. Spruce 5116* (Gray Herb., type; duplicate in K; photo. in herb. Field Mus.).

Although not marked by any outstanding characters, this plant differs in some important detail from each of the species known from Colombia.

## PSEUDOHAMELIA Wernham

**Pseudohamelia hirsuta** Wernham, Journ. Bot. 50: 242. *pl. 521*. 1912.

Type from Ecuador, *Fraser*.

Stipules ovate, caudate-acuminate; leaves oval, about 10 cm. long, acute, ferruginous-pilose; flowers in terminal, dichotomous or trichotomous, subscorpioid cymes, usually sessile; calyx lobes linear, 2–4 mm. long; corolla pilose, the tube 23 mm. long, the 4 lobes 4.5 mm. long; fruit baccate, 2-celled, ovoid, densely villous, 4 mm. long.

This genus is not included in the key to genera here presented, because there is much uncertainty regarding its proper position. Wernham places the plant in the *Hamelieae*, where it would certainly constitute a distinct genus, but I doubt that it is referred correctly to that group. Judging from the illustration, there is little to indicate that the plant has a fleshy fruit. In dried specimens of the Rubiaceae often it is exceedingly difficult to determine whether a fruit is dry or fleshy. In general appearance, as indicated in the illustration, the plant has a strong resemblance to species of *Rondeletia*, and although it does not agree, according to description, with any *Rondeletia* described or reported from Ecuador, I suspect that it should be referred there.

## 11. ELAEAGIA Wedd.

**Elaeagia utilis** (Goudot) Wedd. Monogr. Cinchon. 94. 1849. *Condaminea utilis* Goudot, Compt. Rend. 18: 260. 1844.

In the Kew herbarium there is a specimen from the eastern Andes of Loja, at 1,400–1,800 m., *Lehmann 5446*, which may belong to this species. It consists of leaves only, and the determination is therefore very uncertain. The leaves are 30–40 cm. long and 18–21 cm. wide. The species occurs in the mountains of Colombia.

## 12. ARCYTOPHYLLUM Willd.

**Arcytophyllum Andreanum**, sp. nov.—Frutex erectus dense ramosus, ramis gracilibus, ochraceis vel substramineis, glabris, lucidis, dense foliatis; stipulae ovatae vel triangulari-ovatae, 1.5 mm. longae, acuminatae, coriaceae, adpressae, integrae, dense puberulae, persistentes; folia patentia c. 1 mm. longe petiolata, oblonga, 5–9 mm. longa, 2–3 mm. lata, obtusa, mucronulata, basi obtusa, coriacea, glabra, costa supra sulcata, subtus prominente, marginibus revolutis; flores terminales solitarii sessiles; hypanthium glabrum; calycis lobi 4 oblongi acuti 1.5–2 mm. longi erecti vel apice recurvi, sinu angusto acuto separati; corolla 5 mm. longa extus glabra, tubo superne ampliato, lobis 4 tubo aequilongis oblongo-triangularibus acutiusculis, intus breviter albido-villosis; antherae exsertae oblongo-lineares 1.2 mm. longae; capsula ovalis 3 mm. longa.—Ecuador: Tambo de

Sabanilla, December 18, 1876, *E. André K. 1101* (Herb. Field Mus. No. 533,558, type; duplicates in K and Y). Tungurahua, 3,000 m., *Spruce 5114* (K).

Related to *A. vernicosum* and *A. Jamesonii*, but distinguished from both by the densely puberulent stipules.

**Arcytophyllum aristatum** Standl. Field Mus. Bot. 7: 37. 1930.

Páramos 13 miles west of Tulcán, Prov. Carchi, 3,300 m., *Hitchcock 20923* (W, Y). Hills near Cuenca, August, 1864, *Jameson* (F, S, W). Villanaco, near Loja, *Jameson* (K). Hills near Cuenca, *Jameson 52* (K). Also in Colombia.

A prostrate shrub, the stems glabrous; stipule sheath subtruncate, obscurely bidentate; leaves sessile, narrowly oblong, about 5 mm. long and 1.5 mm. wide, obtuse or acute and piliferous, glabrous, shining; flowers terminal, solitary, subsessile; calyx lobes linear-subulate, 1.8 mm. long; corolla white, glabrous, 4.5 mm. long, the tube nearly twice as long as the lobes.

**Arcytophyllum capitatum** (Benth.) Schum. in E. & P. Nat. Pfl. 4[4]: 28. *f. 8.* 1891. *Rachicallis capitata* Benth. Pl. Hartw. 195. 1845. *Ereicoctis crassifolia* (Spruce) Kuntze, Rev. Gen. Pl. 1: 281. 1891, nomen nudum.

Andes of Ecuador, *Spruce 5829* (G, K). Without locality, *Seemann* (S). Andes of Ecuador, 3,600–3,900 m., *Pearce* (K). Also in Colombia.

An erect glabrous shrub; leaves oblong, acute, coriaceous; stipules broadly ovate, ciliate with several long bristles; flowers sessile in terminal heads; corolla white, the lobes pilose within; calyx lobes linear.

Kuntze's name evidently is based on an unpublished one of Spruce, appearing upon the labels of his *No. 5829.*

**Arcytophyllum confertum** (R. & P.) Standl., var. **bryoides** (R. & S.), comb. nov. *Houstonia bryoides* R. & S. Syst. Veg. 3: 527. 1818. *Hedyotis hypnoides* HBK. Nov. Gen. & Sp. 3: 389. 1820. *Anotis hypnoides* DC. Prodr. 4: 432. 1830. *Hedyotis conferta* R. & P. *β pusilla* Wedd. Chlor. And. 2: 42. 1857. *Ereicoctis hypnodes* Kuntze, Rev. Gen. Pl. 1: 281, 1891.

Type from the Andes of Assuaya, *Humboldt & Bonpland* (photo. of type from Herb. Berol. in F). Loja, Zamora, *André K. 1100* (F, G, K, Y). Cañar, *Rose & Rose 22679* (G, W, Y). Near Cuenca, *Jameson* (G).

A very slender, creeping, matted shrub; leaves subulate-linear, glabrous; flowers terminal, solitary, white.

This form is easily distinguished from the Peruvian type by the very short, slender leaves, and may deserve specific rank.

**Arcytophyllum Jamesonii,** sp. nov.—Frutex erectus dense ramosus, ramis crassis ochraceis vel fuscis glabris, stipulis persistentibus imbricatis fere occultis; stipulae triangulares vel late ovatae, 1.5 mm. longae, glabrae, acutae vel breviter acuminatae, integrae vel 3-denticulatae, adpressae, lucidae; folia ovata c. 4 mm. longa et 2.3 mm. lata, involuta, obtusa, mutica, glabra, supra concava, subtus obtuse carinata, adscendentia vel patentia, coriacea, marginibus tenuibus; flores terminales, sessiles, subcapitati; hypanthium late obovoideum 1.5 mm. longum glabrum; calycis lobi 4 anguste triangulares obtusiusculi vel acuti crassi glabri erecti; corolla extus glabra, tubo crasso 3 mm. longo, lobis 4 patentibus oblongis obtusis 3 mm. longis, intus papilloso-puberulis; capsula subglobosa lucida 2.5 mm. longa.—Ecuador: Vicinity of Cañar, September 16, 1918, *J. N. & George Rose 22771* (U. S. Nat. Herb. No. 1,022,389, type; duplicate in Y). Mount Pillzhicui, 3,600 m., *Jameson* (G).

The plant is much like *A. vernicosum* in general appearance, but differs in its broad involute obtuse leaves, numerous flowers, and broader calyx lobes.

**Arcytophyllum juniperifolium** (R. & P.), comb. nov. *Hedyotis juniperifolia* R. & P. Fl. Peruv. 1: 57. *pl. 87, f. c.* 1798.

Between Oña and Cuenca, Prov. Aznay, 2,700–3,300 m., *Hitchcock 21594* (W). Quebrada Chalán, Punín, 2,760 m., *Anthony & Tate 424* (W). Antisanilla, 3,450 m., *Anthony & Tate 336* (W). Cuenca, *Rose, Pachano & Rose 22883* (W). Also in Peru.

A densely branched shrub, the branches puberulent; stipules ovate, 1–3-dentate; leaves linear, subobtuse, muticous, 2.5–3.5 mm. long, revolute, glabrous; flowers terminal, usually in 3's and short-pedicellate; calyx lobes triangular-lanceolate; corolla glabrous, white.

**Arcytophyllum microphyllum** (Willd.), comb. nov. *Houstonia microphylla* Willd. ex R. & S. Syst. Veg. 3: 527. 1818. *H. serpens* HBK. Nov. Gen. & Sp. 3: 390. *pl. 289.* 1820. *Anotis serpens* DC. Prodr. 4: 433. 1830. *Ereicoctis microphylla* Kuntze, Rev. Gen. Pl. 1: 281. 1891.

Roemer and Schultes give the type locality as "Quindiu" (Colombia), but Kunth states that the type is from the Volcán de Antisana (Ecuador) at 3,900 m. Cuenca, *Rose, Pachano & Rose 23797* (G, Y). Guanojo, *André 3969* (F, G, Y). San José, *André K534* (F, G, Y). Tungurahua, December, 1865, *Spruce* (K). Pichincha, *Holmgren 214* (F, S). Valle de Turubamba, Prov. Pichincha, 2,800 m., *Firmín 646* (W). Weddell reports *Hartweg 1065* and *1067* from Pichincha. Also in Venezuela.

Plants prostrate, the branches filiform; leaves rounded-ovate or elliptic-ovate, subobtuse, glabrous, the margins scaberulous; flowers axillary, solitary, short-pedicellate; capsule broadly rounded, compressed; calyx lobes spatulate-lanceolate, acute.

**Arcytophyllum Riveti** Dang. & Cherm. Bull. Mus. Hist. Nat. Paris 28: 434. 1922.

Type from Chillacocha, at 3,500 m., *Rivet 774*. Surucucho, near Cuenca, July, 1864, *Jameson* (S, W). Villanaco, near Loja, *Jameson* (P). Calaisaca, 2,500 m., *Townsend 999* (W). Ecuador (?), *Lobb* (K). Without locality, *Jameson* (F). Cisne, *André K706* (G). Hills, Loja, *Jameson 50* (K). Loja, *Seemann 929* (K). Villanaco, Prov. Loja, January, 1883, *Hübsch* (K). Zamora, mountains east of Loja, October 1, 1861, *Cross* (K). Also in Peru.

An erect, densely branched shrub, the branches puberulent; stipules triangular, dentate; leaves linear, revolute, 2 mm. long, glabrous; flowers solitary, terminal; calyx lobes lanceolate, acute; corolla 5–6 mm. long, purplish, glabrous.

**Arcytophyllum setosum** (R. & P.), comb. nov. *Hedyotis setosa* R. & P. Fl. Peruv. 1: 57. *pl. 88, f. a.* 1798.

Andes of Ecuador, *Spruce 5887* (G, K, B, S). Without locality, *Lehmann 4683* (W). Quito, *Jameson 43* (G), 148 (G). Without locality, *Lobb 166* (K). Loja, *Seemann 933* (K). Surucucho, near Cuenca, *Jameson 16* (K). Without definite locality, at 4,200 m., *Jameson 138* (K). Also in Peru.

An erect, densely branched, nearly glabrous shrub; leaves oblong to ovate, mostly 5–7 mm. long, acute, mucronate, coriaceous; stipules ovate, ciliate with several long bristles, glabrous; flowers few, at the ends of the branches, subcapitate; corolla glabrous within.

**Arcytophyllum thymifolium** (R. & P.), comb. nov. *Hedyotis thymifolia* R. & P. Fl. Peruv. 1: 56. *pl. 88, f. a.* 1798. *H. coarctata* Willd. ex R. & S. Syst. Veg. 3: 527. 1818. *H. thujoides* Willd. ex R. & S. loc. cit. 1818. *H. thesioides* Willd. ex HBK. Nov. Gen. & Sp. 3: 391. 1820, as syn. *Anotis thymifolia* DC. Prodr. 4: 432. 1830. *Anotis thymifolia* DC. *β thesioides* DC. Prodr. 4: 432. 1830.

Guaranda, *André K535* (F, G). Quitensian Andes, in 1855, *Couthouy* (G, P). Andes, *Spruce 4984* (G). Quito, *Rose & Rose 23543* (G, W, Y). Río Pita, Chillo Valley, 2,940 m., *Anthony & Tate 216* (W). Baños, Prov. Tungurahua, 1,950 m., *Tate 641* (W). Ambato, Prov. Tungurahua, *Pachano 18* (W, Y), *100* (W, Y); alt. 2,600 m., *Hitchcock 21717* (W, Y). Valle de La Magdalena, Prov. Pichincha, 2,800 m., *Firmín* (W). Huigra, *Rose & Rose 22253* (G, W, Y); at 1,200 m., *Hitchcock 20619* (W, Y). Cuenca, *Rose, Pachano & Rose 22883* (Y). Andes, alt. 2,500–3,000 m., *Lehmann 150* (W). Loja, 1,800–2,500 m., *Lehmann 7715* (F, W). Valle de Turubamba, Prov. Pichincha, 2,800 m., *Firmín 512* (F). Volcán de Tungurahua, 1,500–2,500 m., *Lehmann 5137* (F). Chreabamba, *Lehmann B.T.688* (F, G). Pichincha, *Holmgren 224* (F, S). Loja, *Seemann 930* (K), *787* (K). Andes, in 1857–59, *Spruce* (K). Río Chambo, *Spruce 4984* (K). Near Quito, *Hartweg 1073* (Y). Andes of Quito, 2,400–3,000 m., very abundant, *Jameson 748* (L). Pichincha, *Karsten* (L). Prov. Pichincha, 2,700 m., *Firmín 648* (W). "Quito," *Humboldt*

(F, photo. of type of *H. coarctata*, from Herb. Berol.). Also in Colombia and Peru.

An erect shrub, the branches puberulent; stipules triangular-ovate, 1–3-dentate; leaves linear, 5–15 mm. long, revolute; flowers in small terminal cymes; corolla white, glabrous, 6–8 mm. long.

**Arcytophyllum vernicosum,** sp. nov.—Frutex erectus dense ramosus, ramis crassiusculis teretibus ochraceis stipulis persistentibus imbricatis saepius occultis; stipulae 1.5 mm. longae triangulares acutae vel acuminatae coriaceae lucidae arcte adpressae, integrae vel apice obscure bidenticulatae, glabrae; folia sessilia 3–4 mm. longa, 1.5 mm. lata, acuta, basi late rotundata, coriacea, lucidissima, glabra, adscendentia, marginibus valde incrassatis; flores terminales sessiles solitarii vel glomerati; calycis lobi lineari-triangulares 2.5 mm. longi approximati erecti attenuati crassi lucidi; capsula subglobosa 2 mm. longa lucida.—Ecuador: Without locality, *W. Jameson* (Herb. Field Mus. No. 578,871, type; duplicate in W). Without locality, *Seemann* (G). Hills near Loja, September, 1864, *Jameson* (F, S). Hills near Loja, *Jameson 51* (K).

The species is well differentiated by the usually entire, tightly imbricate stipules, by the shining leaves and branches, and by the small size of the leaves.

**TEINOSOLEN** Hook. f. in B. & H. Gen. Pl. 2: 61. 1873.

Schumann (in E. & P. Nat. Pfl. $4^4$: 27. *f. 8, J.* 1891) states that the genus consists of "3–4 species in the Andes of Bolivia and Quito, for example, *T. Jamesonii* K. Sch." *T. Jamesonii* is evidently the plant of Quito, but it has not been published formally. The genus should probably be reduced to synonymy under *Arcytophyllum.*

## 13. GONZALAGUNIA R. & P.

**Gonzalagunia cornifolia** (HBK.) Standl. Field Mus. Bot. 4: 279. 1929. *Gonzalea cornifolia* HBK. Nov. Gen. & Sp. 3: 416. 1819.

Peripa, *André 4228* (F, K). Also in Colombia and Peru.

A slender shrub, the branches often recurved, hispidulous; stipules subulate; leaves short-petiolate, lanceolate to ovate, long-acuminate, at the base obtuse or rounded, appressed-pilose, thin; panicles elongate, spikelike; calyx lobes short, deltoid or rounded; corolla white, 8–10 mm. long; fruit white, 2–3 mm. broad.

**Gonzalagunia dependens** R. & P. Fl. Peruv. 1: 56. *pl. 86.* 1798. *Gonzalea tomentosa* H. & B. Pl. Aequin. 1: 225. *pl. 64.* 1808. *Gonzalagunia tomentosa* Kuntze, Rev. Gen. Pl. 1: 284. 1891. *Duggena tomentosa* Standl. Contr. U. S. Nat. Herb. 18: 126. 1916.

Type of *Gonzalea tomentosa* collected between Loja and Gonzanama, *Humboldt & Bonpland.* Pichincha, *Jameson* (Y). Without locality, *Jameson* (W). Also in Colombia and Peru.

A slender shrub; leaves lanceolate or ovate, rugose, glabrous above, densely white-tomentose beneath; corolla white, the tube 5 mm. long; fruit white, 4-coccous.

**Gonzalagunia flexuosa** Standl. Field Mus. Bot. 4: 280. 1929.

Valley of Pastaza River, between Baños and Cashurco, Prov. Tungurahua, 1,300–1,800 m., *Hitchcock 21803* (Y). Also in Colombia.

A shrub or small tree; leaves short-petiolate, ovate-oblong or narrowly ovate, 10.5–15.5 cm. long, long-acuminate, above sparsely strigose or glabrate, beneath pilose with spreading hairs and strigose along the veins; rachis of the elongate panicle flexuous, densely strigose; calyx lobes oblong-linear, 1–2 mm. long, unequal; corolla white, 6–8 mm. long; fruit 4-coccous.

**Gonzalagunia mollis** Spruce ex Schum. in Mart. Fl. Bras. $6^6$: 290. 1889. *Gonzalea mollis* Wernham, Journ. Bot. 51: 219. 1913. *Duggena mollis* Standl. Contr. U. S. Nat. Herb. 18: 125. 1916.

Andes of Ecuador, *Spruce 5052* (G, type collection).

Leaves short-petiolate, lanceolate, acuminate, rounded or obtuse at the base, canescent-tomentose beneath; calyx lobes ovate-triangular; corolla 12–14 mm. long, appressed-hirsute; fruit 4-coccous.

**Gonzalagunia pulverulenta** (H. & B.) Kuntze, Rev. Gen. Pl. 1: 284. 1891. *Gonzalea pulverulenta* H. & B. Pl. Aequin. 1: 228. 1808. *Duggena pulverulenta* Standl. Contr. U. S. Nat. Herb. 18: 126. 1916.

Type from Gonzanama, *Humboldt & Bonpland.*

Leaves lanceolate, obtuse at the base, pulverulent-pubescent beneath.

The plant is so briefly described that it is impossible to determine whether it is identical with any of the species reported from Colombia, as may very likely be the case.

**Gonzalagunia sessilifolia,** sp. nov.—Frutex tenuis sarmentosus parce ramosus 3-metralis, ramulis gracilibus teretibus dense ochraceo-strigosis, internodiis elongatis; stipulae 10 mm. longae, e basi paullo dilatato lineares, sparse strigosae, persistentes; folia sessilia, late ovata, 6–15 cm. longa, 2.5–8.5 cm. lata, abrupte acuminata, acumine longo angusto caudato-attenuato, basi late rotundata vel subcordata, firme membranacea, supra viridia, glabra, nervis non elevatis, subtus pallida, praesertim ad nervos dense ochraceo-strigosa, inter nervos sparse strigosa vel glabrata, costa gracili elevata, nervis lateralibus utroque latere c. 10, gracilibus, prominentibus, angulo acuto adscendentibus, juxta marginem conjunctis, nervulis vix prominulis arcte reticulatis; paniculae spiciformes simplices flexuosae breviter pedunculatae, 22 cm. longae et ultra, rhachi gracili dense ochraceo-strigosa, floribus glomeratis, glomerulis paucifloris distantibus, bracteis subulatis 2–4 mm. longis; hypanthium globosum dense strigosum 1–1.5

mm. longum; calyx 4-lobus, lobis valde inaequalibus, ovalibus vel oblongis, 1–2.5 mm. longis, obtusis, extus sparse strigosis, intus glabris; corolla alba setoso-strigosa 2.5–3 mm. longa, tubo superne paullo ampliato, lobis 4 brevissimis late ovatis obtusis tubo duplo brevioribus; fructus albus depresso-globosus 4 mm. latus dense strigosus.—Ecuador: Ad radices montis Chimborazo, 900 m., July, 1860, *R. Spruce* (Herb. Kew., type; photo. in herb. Field Mus.).

The large broad sessile leaves and the minute corollas are characters which enable one to differentiate this species from all others known from the region.

**Gonzalagunia sororia,** sp. nov.—Frutex, ramulis gracilibus teretibus dense strigosis vel hinc inde hispidulis, internodiis elongatis; stipulae lanceolato-triangulares longiacuminatae 3–6 mm. longae glabratae erectae persistentes; petiolus crassus 3–4 mm. longus hispidulus; lamina lanceolato-oblonga vel oblongo-ovata, 4.5–7 cm. longa, 1.5–2.5 cm. lata, longiacuminata, acumine obtuso, basi obtusa vel acuta, coriacea, valde rugosa, supra viridis, ad costam strigosa, nervis profunde impressis, subtus pallidior, ad nervos nervulosque pilis brevibus adpressis vel patentibus hispidula, costa gracili elevata, nervis lateralibus utroque latere c. 11, elevatis, angulo acuto adscendentibus, gracilibus, leviter arcuatis, marginem attingentibus, nervulis prominentibus rectis parallelis connexis; paniculae spiciformes 3–7 cm. longae graciles multiflorae, simplices vel prope basin breviter ramosae, rhachi pilis longiusculis patentibus vel adpressis pilosa, floribus solitariis vel aggregatis 1–2 mm. longe pedicellatis; bracteae lineares vel oblongae pedicellis aequilongae vel paullo longiores, fere glabrae; hypanthium subglobosum fere 2 mm. longum strigosum; calyx 1–1.5 mm. longus 4-lobus, lobis triangularibus acutis inaequalibus glabratis; corolla alba in alabastro 5 mm. longa sparse strigosa, tubo superne paullo sensimque dilatato; fructus 4-coccus 3–3.5 mm. latus depresso-globosus, pilis brevibus subadpressis pilosulus.—Ecuador: Between La Chorrita and Portovelo, Prov. Oro, alt. 1,000–2,000 m., August 28, 1923, *A. S. Hitchcock 21176* (U. S. Nat. Herb. No. 1,196,221, type; duplicate in Y).

In its strongly rugose leaves this plant of Ecuador is similar to *G. dependens* R. & P., but in that species the leaves are densely white-tomentose beneath.

## 14. ISERTIA Schreb.

**Isertia hypoleuca** Benth. in Hook. Journ. Bot. 3: 220. 1841.

Ayabamba (Ecuador?), *André 430* (K). Ranging to the Guianas, Brazil, and Peru.

A tree 6–8 m. high; leaves large, long-petiolate, obovate-oblong, densely white-tomentose beneath; panicles large, dense, many-flowered, thyrsoid; corolla tubular, 5–6 mm. long, red, more or less tomentose; fruit baccate.

## 15. HIPPOTIS R. & P.

**Hippotis scarlatina** Krause, Bot. Jahrb. Engler 40: 324. 1908.

In wet forest near Zamora, *Lehmann 7712* (W, type collection; photo. of type ex Herb. Berol. in F).

A tree 10 m. high; leaves short-petioled, elliptic-obovate, acuminate, sericeous beneath, finely striolate between the nerves; flowers axillary; corolla dark red, 2.5–3 cm. long, sericeous.

## 16. PENTAGONIA Benth.

**Pentagonia orthoneura,** sp. nov.—Arbor tenuis 4.5 m. alta ramos paucos patulos proferens, ramulis crassis obtuse tetragonis glabris; stipulae angustae 5 cm. longae acuminatae ferrugineae extus minute strigillosae; folia opposita, petiolo gracili 4.5 cm. longo minutissime puberulo vel glabrato; lamina subcoriacea, oblongo-elliptica, 44 cm. longa, 19 cm. lata, acuta, basi subacuta, supra fusca, dense minuteque adpresso-pilosula, nervis prominulis, subtus brunnescens, obscure minuteque adpresso-pilosula, inter nervulos pulchre et creberrime lineolata, costa gracili elevata, nervis lateralibus utroque latere c. 21, angulo lato divergentibus, gracilibus, elevatis, fere rectis, non ramosis, prope marginem arcuato-conjunctis, nervulis vix prominulis reticulatis; bacca globosa 2.5–3 cm. longa, basi et apice rotundata, glabra, pericarpio 2 mm. crasso; calyx persistens 6 mm. longus 5-lobus, lobis late oblongis obtusis.—Ecuador: At foot of Mount Chimborazo, along the Río Chasuán, rare, alt. 900–1,200 m., August, 1860, *R. Spruce 6231* (Herb. Kew., type; photo. in herb. Field Mus.).

The collector's notes state that "Fruit was abundant, but I could find no good flowers." The specific name here used was suggested by Spruce, but under a new generic name still unpublished.

**Pentagonia peruviana** Standl. Field Mus. Bot. 4: 326. 1929.

Banks of the Río Pastaza, *Spruce 4968* (K, type; photo. in F).

"A scandent shrub;" leaves short-petiolate, obovate-elliptic, 32–45 cm. long, 16–19 cm. wide, acute, at the base acute or subacuminate, glabrous above, strigose beneath along the veins and elsewhere strigillose; flowers clustered in the leaf axils, short-pedicellate; calyx closed before anthesis, in flower spathaceous and cleft along one side, 2 cm. long; corolla 3 cm. long or more, glabrous outside.

It is unfortunate that the specific name *peruviana* should have been given carelessly to this plant, but there is apparently no authority for changing the specific name at the present time.

**Pentagonia Sprucei,** sp. nov.—Arbor tenuis simplex vel ramos perpaucos suberectos emittens 4.5–12-metralis; stipulae crassae 14 cm. longae lanceolato-triangulares longiacuminatae, extus dense pilis brevibus fulvis adscendentibus hispidulae; folia magna, petiolo 9 cm.

longo subtereti dense velutino-pilosulo; lamina coriacea, 27 cm. lata et ultra, basi subcordata, supra glabra, subtus ubique dense velutino-pilosula, costa crassa subtereti, nervis lateralibus angulo recto divergentibus crassis elevatis remote a margine dichotomis, inter nervulos densissime et parallele striato-nervulosa; flores in axillis foliorum cymoso-paniculati, paniculis petiolo brevioribus laxe paucifloris, floribus sessilibus vel subsessilibus; hypanthium turbinatum 7 mm. longum, sparse minuteque puberulum vel glabratum; calyx campanulatus 12 mm. longus glaber 5-lobus, lobis late ovatis obtusis vel acutis; corolla alba coriacea extus glabra, tubo 4 cm. longo basi 5 mm. lato, superne sensim dilatato, fauce 13 mm. lato, intus ad insertionem staminum dense albido-barbato, lobis ovatis obtusis 8 mm. longis; stamina c. 7 mm. supra basin tubi inserta, filamentis 1.5 cm. longis filiformibus glabris; bacca subglobosa 2.5 cm. longa, pericarpio 3 mm. crasso, basi et apice rotundata.—Ecuador: Ad radices montis Chimborazo, secus flum. Chasuán, frequens, alt. 300–1,500 m., July–September, 1860, *R. Spruce 6230* (Herb. Kew., type; photo. in herb. Field Mus.).

When growing this must be a handsome plant, as are most of the other species of the genus. From other South American Pentagonias it is easily distinguished by the copious soft pubescence of the leaves. The stipules, also, are remarkable for their large size.

Spruce indicated the plant as a member of a new genus, doubtless unaware of the fact that similar plants had been described from Panama. It is fitting that this striking plant should bear the name of its discoverer, most celebrated and ablest botanical explorer who has ever worked in western South America.

## 17. SABICEA Aubl.

**Sabicea villosa** R. & S. Syst. Veg. 5: 265. 1819. *S. hirsuta* HBK. Nov. Gen. & Sp. 3: 417. 1820.

Balao, in forest, *Eggers 14401* (L, W). Teresita, *Stevens 74* (W). Wernham (Monogr. Sabicea 55. 1914) reports a specimen from Valle Mindo, *Sodiro*. The species is widely distributed in tropical America.

A scandent shrub; stipules broadly ovate, brown, reflexed; leaves petiolate, elliptic-oblong, acuminate at each end, hirsute, 6–12 cm. long; flowers sessile in axillary clusters; calyx lobes linear-lanceolate, up to 4 mm. long, accrescent; corolla white, the tube 6 mm. long, strigose above, the lobes triangular, minute; fruit violet, fleshy, 1 cm. long.

## 18. BERTIERA Aubl.

**Bertiera procumbens** Schum. & Krause, Bot. Jahrb. Engler 40: 328. 1908.

Balao, in forest, *Eggers 14282* (W, type collection).

A shrub 2.5 m. high; leaves very shortly petiolate, oblong or oblong-lanceolate, 6–12 cm. long, acuminate, pilose; flowers small,

white, in terminal panicles 8–12 cm. long; berries globose, blue, glabrous, 2–3 mm. in diameter.

## 19. HAMELIA Jacq.

**Hamelia grandiflora** Spruce ex Wernham, Journ. Bot. 49: 209. 1911.

Type from Chimborazo, *Spruce 6193;* also *Triana 1759.* Teresita, Prov. Guayas, 270 m., *Hitchcock 20554* (W, Y).

A tree; leaves mostly verticillate, elliptic or elliptic-oblong, 15–25 cm. long, glabrous; corolla 3 cm. long, yellow, funnelform; fruit 1 cm. long.

**Hamelia patens** Jacq. Enum. Pl. Carib. 16. 1760.

El Recreo, *Eggers 15449* (F). Ventura, *Rose & Rose 23516* (G, Y). Between Huigra and Naranjapata, Prov. Chimborazo, 600–1,200 m., *Hitchcock 20685* (W, Y). Chimborazo, 750–900 m., *Spruce 6226* (K). San Ignacio, Prov. Guayas, *Heilborn 81* (F, S). Widely distributed in tropical America.

A shrub or small tree, sometimes 4.5 m. high; leaves mostly ternate, pubescent or tomentose beneath; corolla short, tubular, orange-red; fruit a juicy berry.

**Hamelia pedicellata** Wernham, Journ. Bot. 49: 212. 1911.

Milagro, Prov. Guayas, 50 m., *Hitchcock 20291* (W, Y). Also in Colombia and Venezuela.

A shrub 2 m. high; leaves mostly in 4's, nearly glabrous; flowers chiefly pedicellate; corolla tubular, 1.5 cm. long; berries red or purple.

## 20. HOFFMANNIA Sw.

**Hoffmannia ecuatoriana,** sp. nov.—Frutex 1.8 m. altus, ramis crassis teretibus glabris, internodiis elongatis; stipulae non visae; folia opposita, petiolo vero fere nullo; lamina elliptica vel obovato-elliptica, membranacea, c. 24 cm. longa et 10 cm. lata, abrupte angusteque acuminata, acumine attenuato acuto, basin versus angustata, abrupte contracta et longissime decurrens, parte infima petioliformi et c. 4 cm. longa, supra viridis, glabra, nervis non elevatis, costa subimpressa, subtus pallidior, ad nervos sparse et minutissime puberula vel fere omnino glabra, costa crassa elevata, nervis lateralibus utroque latere c. 15, angulo lato adscendentibus, arcuatis, gracilibus, prominentibus, prope marginem conjunctis, nervulis prominulis laxe reticulatis; flores cymosi, cymis ad nodos inferiores defoliatos insertis, laxe paucifloris, 2 cm. longe pedunculatis, pedicellis 2–4 mm. longis glabris; hypanthium obovoideum 2 mm. longum glabrum; calyx brevissime 4-dentatus glaber, dentibus latissime triangularibus; corolla rubra in alabastro oblongo-linearis obtusa, extus glabra, lobis 4 linearibus tubo duplo longioribus.—Ecuador: Province Tungurahua, Valley of Pastaza River between Baños and Cashurco, alt. 1,300–

1,800 m., September 25, 1923, *A. S. Hitchcock 21836* (Gray Herb., type; duplicates in W and Y).

**Hoffmannia Sprucei,** sp. nov.—Ramuli graciles teretes dense ferrugineo-villosuli, vetustioribus fusco-ferrugineis, internodiis elongatis; stipulae triangulares acutae 2 mm. longae ferrugineo-tomentulosae; folia opposita, petiolo gracili 1.3–2.2 cm. longo villosulo; lamina subcoriacea, elliptico-oblonga vel ovato-oblonga, 9–13 cm. longa, 3.5–4.7 cm. lata, abrupte acuminata, acumine angusto obtuso, basi acuta vel contracta et decurrens, supra sparse villosula, nervis non elevatis, subtus ferruginea, ubique ferrugineo-villosula, costa gracili elevata, nervis lateralibus utroque latere c. 10, gracilibus, angulo lato adscendentibus, prominentibus, prope marginem conjunctis, nervulis prominulis laxe reticulatis; inflorescentiae axillares sessiles, e basi ramosae, 1–2.5 cm. longae, multiflorae, floribus cymosis 1–4 mm. longe pedicellatis vel rarius sessilibus, pedicellis ferrugineo-villosis; hypanthium turbinatum 1.5 mm. longum villosulum; calyx 1–1.4 mm. longus villosulus, dentibus triangularibus acutis erectis; corolla extus glabra 6–7 mm. longa, tubo superne vix dilatato, lobis oblongis obtusis tubo fere duplo brevioribus.—Ecuador: Andes of Ecuador, 1857–59, *R. Spruce 5098* (Gray Herb., type; photo. in herb. Field Mus.).

Related to *H. latifolia* (Bartl.) Kuntze, of Peru and Bolivia, but distinct in the much narrower leaves on long petioles.

## 21. RANDIA L.

**Randia aculeata** L. Sp. Pl. 1192. 1753. *R. glomerata* Benth. Bot. Voy. Sulph. 103. 1844.

Type of *R. glomerata* from Atacames. The species ranges northward to Mexico, and is widely distributed in the West Indies.

A spiny shrub with small, nearly or quite glabrous leaves; corolla white, 6 mm. long, the throat barbate; fruit globose, 6–12 mm. in diameter, the pulp blackish and full of large seeds.

Although I have seen no specimens of this species from Ecuador, the description of *R. glomerata* indicates that the plant so named is merely a form of *R. aculeata.*

**Randia aurantiaca** Standl. Field Mus. Bot. 4: 327. 1929.

Playas, Peninsula Morro, *Mille 190* (W). Also in Peru.

An unarmed shrub 1–4 m. high; leaves oblong-elliptic or obovate-elliptic, 4–13 cm. long, 2.5–6.5 cm. wide, obtuse or abruptly short-acuminate, sparsely or densely pilose above, densely grayish-tomentose beneath; flowers perfect, solitary or clustered at the tips of the branches; calyx lobes linear-subulate; corolla orange, densely grayish-sericeous, the tube 2 cm. long, the lobes ovate-oblong, long-acuminate, 2.5 cm. long; immature fruit ellipsoid, 1.5 cm. long, puberulent.

**Randia calycina** Cham. Linnaea 9: 246. 1834. *Basanacantha calycina* Schum. in Mart. Fl. Bras. 6[6]: 375. 1889.

Balao, in forest, *Eggers 14392* (W). El Recreo, Prov. Manabi, *Eggers 15521* (K, L, W). Also in Bolivia and Brazil.

A spiny shrub 2 m. high; leaves oblong-obovate to rounded-obovate, nearly glabrous; flowers dioecious; calyx lobes obovate or oblanceolate; corolla 2–2.5 cm. long, glabrous.

Similar to *R. spinosa*, but in that species the calyx lobes are linear or subulate.

**Randia formosa** (Jacq.) Schum. in Mart. Fl. Bras. 6[6]: 342. 1889. *Mussaenda formosa* Jacq. Enum. Pl. Carib. 16. 1760.

Balao, in savannas, *Eggers 14192* (L, W). Guayaquil, in 1852, *Andersson* (S). Widely distributed in South America, Panama, and the West Indies.

An unarmed shrub; leaves more or less pilose beneath; flowers perfect; corolla white, the slender tube 5–10 cm. long, the lobes lanceolate to ovate, acuminate; fruit large, oblong.

**Randia spinosa** (Jacq.) Karst. Fl. Columb. 2: 128. 1869. *Mussaenda spinosa* Jacq. Sel. Stirp. 70. 1763. *Gardenia armata* Sw. Prodr. Veg. Ind. Occ. 51. 1788. *R. armata* DC. Prodr. 4: 387. 1830. *M. pubescens* HBK. Nov. Gen. & Sp. 3: 410. 1818. *Gardenia Humboldtiana* R. & S. Syst. Veg. 5: 243. 1819. *M. Humboldtiana* Steud. Nom. Bot. 540. 1841. *G. pubescens* Bartl. ex DC. Prodr. 4: 387. 1830, as syn. *Basanacantha spinosa* Schum. in Mart. Fl. Bras. 6[6]: 376. 1889. *B. spinosa* var. *pubescens* Schum. in Mart. Fl. Bras. 6[6]: 378. 1889.

"Guayaquil," *Ruiz* (B). Type of *M. pubescens* from Guayaquil, *Humboldt & Bonpland* (photo. of type, ex Herb. Berol., in F). Widely distributed in tropical America.

A spiny shrub or small tree; leaves usually pubescent, large; flowers dioecious; corolla white, the tube about 2.5 cm. long; fruit subglobose, 2.5–3.5 cm. long, filled with blackish pulp and few large seeds.

## 22. GENIPA L.

**Genipa americana** L. Syst. Nat. ed. 10. 931. 1759. *G. oblongifolia* R. & P. Fl. Peruv. 2: 67. *pl. 220, f. a.* 1799.

Reported by DeCandolle (Prodr. 4: 378. 1830) from Guayaquil. Widely distributed in tropical America.

A medium-sized tree; leaves large, obovate, short-petiolate, glabrous; flowers yellowish white, 2–4.5 cm. long, in small terminal cymes; fruit globose, brownish, 6–7 cm. long, the pulp filled with numerous large compressed seeds.

## 23. MACHAONIA H. & B.

**Machaonia acuminata** H. & B. Pl. Aequin. 1: 101. *pl. 29.* 1808.

Type from Guayaquil, *Humboldt & Bonpland* (fragment, ex Herb. Berol., in F). Daule, *Spruce 6303* (S). Banks of Guayaquil River, *Jameson 526* (L). Also in Brazil and Colombia.

A small tree; leaves ovate-elliptic, acuminate, short-petiolate, densely pubescent beneath; flowers very small, in broad panicles; sepals ovate, obtuse; fruit dry, densely pubescent.

The vernacular name is given as "ceiba blanca."

## 24. GUETTARDA L.

**Guettarda hirsuta** (R. & P.) Pers. Syn. Pl. 1: 200. 1805. *Laugeria hirsuta* R. & P. Fl. Peruv. 2: 22. *pl. 45, f. a.* 1799.

Andes of Ecuador, *Spruce 5195* (G, Y). Also in Peru.

A shrub or small tree; leaves elliptic, acuminate, fulvous-tomentose beneath, hirsute along the nerves, at least when young, glabrate above.

The Ecuador collection may be distinct from the Peruvian plant, but more material from both regions is necessary in order to determine the specific variations.

## 25. ANISOMERIS Presl

**Anisomeris ecuadorensis** Schum. Bot. Jahrb. Engler 40: 329. 1908.

Hacienda El Recreo, Prov. Manabi, *Eggers 15411* (F, W, type collection; photo. of type from Herb. Berol., in F). El Recreo, April 30, 1897, *Eggers* (F).

A tree 5–6 m. high; leaves ovate-elliptic or elliptic, 4–6 cm. long, barbate beneath in the axils of the nerves; corolla tube 20–23 mm. long.

## 26. CHIOCOCCA L.

**Chiococca alba** (L.) Hitchc. Rept. Mo. Bot. Gard. 4: 94. 1893. *Lonicera alba* L. Sp. Pl. 175. 1753. *C. racemosa* L. Syst. Nat. ed. 10. 917. 1759. *C. brachiata* R. & P. Fl. Peruv. 2: 67. *pl. 219.* 1799. *C. trisperma* Hook. f. Trans. Linn. Soc. 20: 219. 1847.

El Recreo, *Eggers 15409* (F); reported from the Galapagos Islands. Widely distributed in tropical America.

A slender shrub, the branches usually long and recurved or frequently subscandent; flowers pale yellow or whitish, small; fruit compressed, orbicular, white, fleshy.

## 27. COFFEA L.

**Coffea arabica** L. Sp. Pl. 172. 1753.

Coffee has long been grown in the mountains of Ecuador, and is an important article of export from regions in which the climate is

suitable. The coffee of Ecuador is of superior quality, ranking with that of Colombia, Venezuela, and Central America.

## 28. IXORA L.

**Ixora sparsifolia** Krause, Bot. Jahrb. Engler 40: 328. 1908.

In forests and thickets, Entable, near Naranjal, *Lehmann 5589* (W, type collection; photo. of type, ex Herb. Berol., in F).

A shrub 3 m. high; leaves nearly sessile, oblong or elliptic-oblong, 14–21 cm. long, 4–8 cm. wide, short-acuminate, acutish at the base, puberulent beneath along the costa; panicles lax, trichotomous, pedunculate, the flowers 4-parted, slender-pedicellate; calyx lobes broadly ovate, obtuse, puberulent; corolla pinkish white, puberulent, the tube 7 mm. long, the lobes shorter, spreading.

## 29. MORINDA L.

**Morinda Roioc** L. Sp. Pl. 176. 1753.

Balao, in forest, *Eggers 14217* (L). Widely distributed in tropical America.

A shrub about 2.5 m. high, often subscandent; leaves mostly linear-oblong to oblanceolate-oblong, acute or acuminate, glabrous or sparsely pubescent; flowers white, 1 cm. long, in small dense heads on peduncles 3–10 mm. long; fruits fleshy.

## 30. COUSSAREA Aubl.

**Coussarea pilosiflora** Standl., sp. nov.—Frutex, praeter corollas omnino glaber, ramulis gracilibus, obtuse tetragonis, internodiis elongatis; stipulae 3 mm. longae, rotundatae, erectae, persistentes; folia opposita, petiolis gracilibus, 1.3–1.6 cm. longis; limbus oblanceolato-oblongus vel obovato-oblongus, 11.5–15 cm. longus, 3.5–5.5 cm. latus, abrupte acuminatus, acumine anguste triangulari, obtusiusculo, basi acutus, membranaceus, concolor, costa et nervis lateralibus utrinque prominentibus, gracilibus, nervis lateralibus utroque latere c. 10, angulo lato divergentibus, fere rectis, prope marginem irregulariter arcuato-conjunctis, nervulis prominulis, reticulatis; inflorescentiae cymoso-paniculatae, terminales, pauciflorae, c. 8 mm. longe pedunculatae, 2–3 cm. longae, cymulis breviter pedunculatis, 3–6-floris, floribus sessilibus vel brevissime pedicellatis; hypanthium obovoideum, 1.5 mm. longum; calyx 1.2 mm. longus, hypanthio latior, subtruncatus et remote 4-denticulatus; corolla alba, extus pilis sparsis patentibus pilosa, tubo gracili, 11 mm. longo, superne vix dilatato, fauce 1.5 mm. lato, lobis 4, anguste oblongis, obtusis, 6 mm. longis. —Ecuador: Valley of Pastaza River, between Baños and Cashurco, 8 hours east of Baños, Prov. Tungurahua, alt. 1,300–1,800 m., September 25, 1923, *A. S. Hitchcock 21848* (U. S. Nat. Herb. No. 1,196,554, type; duplicate in herb. N. Y. Bot. Gard.).

The species is noteworthy because of the pilose corollas.

## 31. FARAMEA Aubl.

**Faramea coerulescens** Schum. & Krause, Bot. Jahrb. Engler 40: 347. 1908.

Between Pindilie and Shoray, Prov. Cuenca, 2,800–3,000 m., *Lehmann 4935* (F, photo. of type ex Herb. Berol.). Loja, *Ruiz & Pavón* (?; K). Also in Peru.

A shrub 3–5 m. high; stipules triangular, acuminate; petioles 3–5 mm. long; leaf blades oblong or obovate-oblong, 3.5–8 cm. long, shortly obtuse-acuminate, cuneate at the base, rigid-coriaceous; corymbs few-flowered; calyx 4-dentate; corolla white, the tube 18–20 mm. long, the lobes one-third as long.

**Faramea cuencana,** sp. nov.—Ramuli graciles teretes virides glabri, internodiis elongatis; stipulae cito deciduae, non visae; folia brevissime petiolata, opposita, petiolo 2–3 mm. longo glabro supra sulcato; lamina firme membranacea, oblonga vel anguste oblonga, 6–9.5 cm. longa, 1.5–3 cm. lata, abrupte caudato-acuminata, acumine angusto interdum lineari 1–1.5 cm. longo attenuato, basi acuta vel obtusa et abrupte contracta, utrinque glabra, supra atro-viridis, lucida, costa nervisque prominentibus, subtus paullo pallidior, costa gracili elevata, nervis lateralibus utroque latere c. 14, gracillimis, prominentibus, angulo fere recto divaricatis, remote a margine arcuato-conjunctis, nervulis prominulis laxe reticulatis; inflorescentia terminalis sessilis cymoso-paniculata laxe multiflora, basi trichotoma, ramis adscendentibus gracilibus glabris, bracteis paucis subulatis 2–3 mm. longis, floribus pedicellatis, pedicellis gracilibus rectis plerumque 3–8 mm. longis; hypanthium obovoideum glabrum 1–15. mm. longum; calyx 2 mm. longus profunde 4-lobus, laciniis anguste lanceolatis longe angusteque attenuatis; corolla 8–10 mm. longa extus glabra, tubo gracili superne paullo dilatato, lobis 4 anguste oblongis acuminatis tubo paullo brevioribus.—Ecuador: Eastern Andes, Cuenca, alt. 1,500–1,800 m., *Pearce* (Herb. Kew., type; photo. in herb. Field Mus.).

**Faramea guayaquilensis** DC. Prodr. 4: 497. 1830. *Tetramerium multiflorum* Bartl. ex DC., loc. cit., as syn.

Type from Guayaquil, *Haenke.*

Leaves oblong, subsessile, acuminate; stipules oblong, acuminate, subaristate, persistent; panicles terminal, trichotomous.

Perhaps referable to some other genus, for it is stated that the upper stipules are bifid.

**Faramea maynensis** Spruce ex B. & H. Gen. Pl. 2: 121. 1873, nomen nudum; Rusby, Mem. N. Y. Bot. Gard. 4: 300. 1907.

Teresita, Prov. Guayas, 270 m., *Hitchcock 20449* (W, Y). Also in Peru and Bolivia.

A glabrous shrub 1–2.5 m. high; stipules aristate-acuminate; leaves narrowly oblong, caudate-acuminate, thin; flowers cymose-

corymbose; calyx 4-denticulate; corolla blue, glabrous, 12–17 mm. long, the lobes equaling or shorter than the tube; fruit about 14 mm. broad.

## 32. GEOPHILA Don

**Geophila herbacea** (Jacq.) Schum. in E. & P. Nat. Pfl. 4[4]: 119. 1891. *Psychotria herbacea* Jacq. Enum. Pl. Carib. 16. 1760.

El Recreo, March 10, 1897, *Eggers* (F). Without locality, *Eggers 14904* (W). Widely distributed in the lowlands of tropical America, often growing as a weed.

A creeping perennial herb; leaves long-petiolate, rounded to ovate, cordate; flowers small, white, in terminal long-pedunculate few-flowered heads; ovary glabrous; fruits fleshy, red or black, 5 mm. long.

## 33. CEPHAELIS Sw.

**Cephaelis jacobinioides,** sp. nov.—Frutex 2.5 m. altus dichotome ramosus, ramulis gracilibus subteretibus viridibus, novellis sparse puberulis, internodiis 1.5–5 cm. longis; stipulae persistentes erectae, basi in vaginam brevem connatae, glabrae, profunde bifidae, laciniis lanceolatis attenuatis; folia opposita, petiolo gracili 1–2.3 cm. longo, sparse et minute strigilloso vel fere glabro; lamina crasse membranacea, elliptico-oblonga vel elliptica, 10–17 cm. longa, 4–7.5 cm. lata, abrupte acuminata, acumine anguste triangulari superne attenuato apice obtuso, basi acuta vel subobtusa, interdum abrupte contracta et cuneatim decurrens, supra laete viridis, glabra, costa prominente, nervis conspicuis sed non elevatis, subtus paullo pallidior, ubique minute strigillosa, costa gracili elevata, nervis lateralibus utroque latere c. 27, gracilibus, prominentibus, angulo lato adscendentibus, subarcuatis, prope marginem nervum distinctum regularem collectivum efformantibus, nervis subregularibus fere rectis costis secundariis subparallelis inter nervos interpositis, nervulis prominulis laxe reticulatis; inflorescentia terminalis 1.8 cm. longe pedunculata vel fere sessilis, subcapitata, densissime multiflora, c. 3 cm. longa et fere aequilata, basi foliis 2 magnis bracteata, e capitulis paucis secundariis dense congestis subsessilibus efformata, bracteis numerosis arcte adpresso-imbricatis, exterioribus majoribus basi breviter connatis vel fere distinctis, ovatis vel lanceolato-oblongis, 1.5–1.8 cm. longis, acutis vel acuminatis, margine hispidulis, sanguineo-purpureis, saepe profunde bifidis, bracteis interioribus angustioribus, lanceolatis vel lanceolato-linearibus, brevioribus; flores inter bracteas sessiles; hypanthium glabrum vix 1 mm. longum; calyx 5–partitus, laciniis linearibus viridibus 4–5 mm. longis ciliatis; corolla alba, tubo 6–7 mm. longo superne paullo dilatato extus glabro, lobis 5 anguste oblongis patentibus acutiusculis.—Ecuador: At the base of Mt. Chimborazo, alt. 900 m., June, 1860, *R. Spruce 6188* (Herb. Kew., type). In forest, 400–900 m., *Sodiro 8436* (B).

A species well marked by the many-veined leaves and by the distinctive form of the inflorescence with its very numerous narrow bracts irregularly imbricate in numerous series.

**Cephaelis Jamesonii**, sp. nov.—Frutex subramosus 3-metralis, ramulis gracilibus primo dense pilis rigidiusculis saepe subretrorsis villosis, serius glabratis et tuberculatis, internodiis 1.5–5 cm. longis; stipulae 3–4 mm. longae, breviter connatae, basi villosae, ad medium bilobae, lobis triangularibus subacutis glabratis ciliatis; folia opposita, petiolo crasso 4–7 mm. longo villoso; lamina late ovata vel ovato-elliptica, 4–5.5 cm. longa, 2.3–3.2 cm. lata, acuta vel subobtusa, basi rotundata, coriacea, supra flavo-viridis, ad nervos sparse villosula, saepe scaberula, costa nervisque prominulis, nervulis subimpressis, subtus fere concolor, ad costam validam elevatam villosa, aliter glabra, nervis lateralibus utroque latere c. 8, prominentibus, gracilibus, saepius angulo acuto adscendentibus, rectis vel leviter curvis, prope marginem conjunctis, nervulis obscuris; inflorescentia axillaris pauciflora capitata, 2.5–3 cm. longe pedunculata, pedunculo dense villoso, floribus sessilibus; bracteae involucrantes, late ovatae, c. 1.5 cm. longae, acutae, erectae, parte inferiore villosae, superne glabrae; corolla infundibuliformis, tubo 2.5 cm. longo, inferne glabro, superne sparse villoso, fauce 6 mm. lato, lobis ovatis obtusis 6 mm. longis, extus pilis longis mollibus villosis, intus fere glabris; fructus oblongus 7 mm. longus glabratus; semina facie ventrali profunde angusteque sulcata.—Ecuador: In declivitate occidentali montis Pichincha, alt. 2,400 m., in 1864, *W. Jameson* (U. S. Nat. Herb. No. 534,965, type). Valle de Pallatenga, 2,700 m., *Spruce 5521* (K). Dense forest, Alto de Panga, near Pallatenga, 2,000–2,400 m., September, 1894, *Lehmann K. 143* (K).

A well-marked species, in general appearance somewhat suggesting the genus *Coccocypselum*. It is remarkable for the very large corollas and copious pubescence.

**Cephaelis peruviana** Wernham, Journ. Bot. 51: 221. 1913.

Type from Guayaquil, *Ruiz & Pavón*.

Branches ferruginous-pilose; stipules broadly ovate, 2-aristate; leaves short-petiolate, broadly elliptic, 6 cm. long and 3.5 cm. wide, obtuse, rounded at the base, pilose along the nerves; heads oblong, 2.5 cm. long, pedunculate, the 4 bracts nearly glabrous, ovate; flowers usually 3; corolla glabrous outside, the tube 1.5 cm. long.

The specific name is a misleading one, for the plant is not known at present from Peru.

**Cephaelis Remyana** (Baill.), comb. nov. *Uragoga Remyana* Baill. Adansonia 12: 253. 1879.

Type collected in forest between Guaranda and Bodegas, *Remy*.

Glabrous; stipules connate into a deciduous sheath; leaves long-petiolate, ovate-lanceolate, 15 cm. long and 8 cm. wide, acuminate,

paler beneath; flower heads terminal, in clusters of 2–3, the bracts ovate, acute, imbricate; corolla tube slender, the 5 lobes ovate, acute, recurved.

**Cephaelis tomentosa** (Aubl.) Vahl, Eclog. Amer. 1: 19. 1796. *Tapogomea tomentosa* Aubl. Pl. Guian. 1: 160. *pl. 61*. 1775. *Uragoga tomentosa* Kuntze, Rev. Gen. Pl. 1: 301. 1891.

Between Santa Rosa and La Chorrita, Prov. Oro, 100 m., *Hitchcock 21119* (W, Y). Ranging northward to Mexico and south to Bolivia.

A hirsute shrub 1–2.5 m. high; leaves short-petiolate, lanceolate to ovate-elliptic, long-acuminate; flower heads terminal, pedunculate, large, dense, the large bracts red, longer than the flowers; corollas yellow; fruits blue.

## 34. PSYCHOTRIA L.

**Psychotria acutiflora** DC. Prodr. 4: 506. 1830. *Guettarda acutiflora* Bartl. ex DC., loc. cit., as syn.

Type from Guayaquil, *Haenke*.

Stipules connate, the free portion lanceolate; leaves oblong, acuminate, ciliate, pubescent beneath, scaberulous above, hirsute-tomentose on the costa; inflorescence terminal, paniculate, hirsutulous, longer than the leaves.

**Psychotria alba** R. & P. Fl. Peruv. 2: 58. *pl. 205, f. a*. 1799.

Balao, *Eggers 14266* (B, L, W). Río Tenguel, Prov. Guayas, *Holmgren 70* (F, S). Widely distributed in South America.

A nearly glabrous shrub 2 m. high; stipules large, brown, obtuse, caducous; leaves petiolate, elliptic-oblong to obovate, acute or acuminate, minutely puberulent beneath on the nerves or nearly glabrous; inflorescence terminal, pedunculate, paniculate, many-flowered, trichotomous or radiately branched at the base, the bracts minute, deciduous; flowers short-pedicellate; calyx minutely denticulate; corolla 4 mm. long, white, minutely puberulent or glabrous; fruit 4.5 mm. long.

**Psychotria angustata** Anders. Vet. Akad. Handl. Stockh. 1853: 193. 1855.

Type from Charles Island, Galapagos Islands, *Andersson*.

A glabrous shrub; stipules oval, obtuse, deciduous; leaves petiolate, broadly lanceolate, acute, narrowed to the petiole, 7.5–8.5 cm. long, 3.5 cm. wide; inflorescence axillary, pedunculate, thyrsiform, shorter than the leaves; calyx obscurely 5-dentate; corolla pink, barbate in the throat, the 5 lobes ovate-oblong, obtuse; fruit 4–6 mm. long, subglobose, 10-costate.

**Psychotria brachiata** Sw. Prodr. Veg. Ind. Occ. 45. 1788.

Forests of Zamora, Loja, 1,000 m., *Lehmann 5653* (Y). Widely distributed in tropical America.

A shrub with glabrous branches; stipules short, green, persistent, bilobate, the lobes rounded; leaves petiolate, oblong-obovate to elliptic-oblong, acuminate, at the base acute to attenuate, glabrous or nearly so; inflorescence terminal, pedunculate, paniculate, the branches divaricate, opposite, subtended by long narrow involute bracts, the flowers in dense bracted clusters; corolla 1 cm. long, pubescent; fruit blue, glabrous.

**Psychotria carthaginensis** Jacq. Enum. Pl. Carib. 16. 1760. *P. foveolata* R. & P. Fl. Peruv. 2: 59. *pl. 207, f. b.* 1799.

Baños, Prov. Tungurahua, 1,800 m., *Heilborn 384* (F, S). Widely distributed in South America.

A nearly glabrous shrub; stipules obovate, obtuse, brown, caducous; leaves petiolate, lance-elliptic to oblong-obovate, acute or acuminate, acute to attenuate at the base, minutely puberulent beneath or glabrate; inflorescence terminal, pedunculate, paniculate, usually radiately branched at the base, open, many-flowered, the bracts minute, deciduous; flowers sessile; calyx denticulate; corolla white, 4 mm. long, minutely puberulent or glabrous; fruit red, 4 mm. long, costate, glabrous.

**Psychotria chimboracensis,** sp. nov.—Arbor 6-metralis patule ramosus, ramulis crassiusculis subteretibus glabris, internodiis brevibus vel elongatis; stipulae caducae late ovatae 13–14 mm. longae, obtusae vel subacutae, dense ferrugineo-tomentulosae; folia petiolata opposita, petiolo valido 6–12 mm. longo subtus ferrugineo-villosulo; lamina chartacea, oblongo-elliptica, oblonga vel obovato-oblonga, plerumque 15–26 cm. longa et 6–12.5 cm. lata, acuta vel breviter acuminata, basi acuta vel basin versus longius angustata, supra fusca, glabra, nervis non elevatis, subtus pallidior, brunnescens, ubique vel tantum ad nervos ferrugineo-villosula, serius glabrata, costa valida elevata, nervis lateralibus utroque latere c. 17, gracilibus, angulo lato adscendentibus, fere rectis, prominentibus, prope marginem conjunctis, nervulis obscuris; inflorescentia terminalis 4 cm. longe pedunculata late cymoso-paniculata dense multiflora, c. 9 cm. longa et 14 cm. lata, pedunculo crasso compresso, ramis oppositis divaricatis glabris vel sparse ferrugineo-villosulis, floribus ad apices ramulorum dense capitato-glomeratis sessilibus, bracteis plerumque deciduis 1–2 mm. longis interdum persistentibus et reflexis ferrugineo-puberulis; hypanthium late turbinatum 1.5–2 mm. longum glabrum; calyx 2–3 mm. longus late campanulatus glaber breviter 5-lobus, lobis late triangularibus obtusis pilis minutis ferrugineis ciliatis; corolla eburnea, tubo 3–3.5 mm. longo obconico extus glabro, in fauce pilis lilacinis dense barbato, lobis 5 oblongo-triangularibus tubum fere aequantibus, apice acutiusculis et cucullatis; antherae exsertae 1.5 mm. longae oblongae.—Ecuador: At the base of Mt. Chimborazo, alt. 750 m., July, 1860, *R. Spruce 6192* (Herb. Kew., type; photo. in herb. Field Mus.).

**Psychotria cuneifolia** DC. Prodr. 4: 507. 1830. *P. glabrata* Bartl. ex DC., loc. cit., as syn.

Type from Guayaquil, *Haenke.*

Glabrous; leaves obovate, long-acuminate, short-cuspidate; stipules small, deciduous; panicles erect, shorter than the leaves, the branches opposite; fruit ovoid-globose, 10-striate.

The description is too brief to enable one to identify the species.

**Psychotria Haenkeana** DC. Prodr. 4: 507. 1830. *P. pedunculata* Bartl. ex DC., loc. cit., as syn.

Type from Guayaquil, *Haenke.*

Glabrous; stipules bifid, acuminate; leaves oval-oblong, acuminate at each end; peduncles slightly shorter than the leaves, the cymes contracted, obconic; flowers and fruit unknown.

The description is too brief for determination, and it appears to be somewhat misleading as regards the stipules. There is at hand a photograph of a specimen in the Berlin herbarium which probably belongs to the type collection of this species. Dr. Urban has indicated on the sheet that the plant is *Psychotria marginata* Sw., but it seems to me to belong more probably with *P. alba* R. & P.

**Psychotria hebeclada** DC. Prodr. 4: 513. 1830.

Río de Ventanas, near Guayaquil, *Spruce 6350* (K, L). Ranging northward to Mexico.

A shrub 2.5 m. high, the young branches densely puberulent; stipules short, green, persistent, bidentate; leaves thin, petiolate, ovate to oblong-elliptic, long-acuminate, acute or attenuate at the base, finely pubescent, at least beneath; inflorescence terminal, pedunculate, thyrsoid-paniculate, dense, many-flowered, densely pubescent; calyx lobes short, ovate, acute or obtuse; corolla whitish, 5 mm. long, pubescent; fruit glabrate, subglobose, 4 mm. long.

**Psychotria horizontalis** Sw. Prodr. Veg. Ind. Occ. 44. 1788.

El Recreo, *Eggers 15410* (F, K, L, W), *15205* (F, K). Ranging northward to Mexico and the West Indies.

A nearly glabrous shrub; stipules ovate-triangular, 3–8 mm. long, entire, caducous; leaves short-petiolate, elliptic to lance-oblong, acuminate, at the base usually acute, glabrous or nearly so; inflorescence terminal, pedunculate, cymose-paniculate, small, the branches puberulent, the flowers sessile, the bracts minute, caducous; calyx deeply lobate, the lobes linear; corolla 3–4 mm. long, white, glabrous; fruit red, glabrous, 4 mm. long.

**Psychotria justiciaefolia,** sp. nov.—Frutex, ramulis gracilibus obtuse tetragonis dense pilis pallidis adpressis vel subadpressis pilosis, internodiis elongatis; stipulae 10–14 mm. longae persistentes breviter connatae dense pilosae, ad medium vel profundius bilobae, lobis

anguste lanceolatis longiattenuatis; folia opposita, petiolo 1–3 cm. longo gracili dense pilis longis piloso; lamina oblongo-elliptica vel rarius obovato-elliptica, 9–20 cm. longa, 3–9 cm. lata, longe abrupteque acuminata, acumine angusto obtuso vel acuto, papyracea, supra viridis, sparse setoso-pilosa vel glabrata, nervis prominulis, subtus pallidior, subdense pilis longis debilibus subadpressis pilosa, costa gracili elevata, nervis lateralibus utroque latere c. 16, gracillimis, prominentibus, angulo acuto vel lato adscendentibus, arcuatis, prope marginem conjunctis, nervulis prominulis laxe reticulatis; inflorescentia terminalis 1.5–5 cm. longa, 1–2 cm. lata, 1–4 cm. longe pedunculata, thyrsoideo-paniculata, densissime multiflora, interdum spiciformis, pedunculo crasso dense piloso, ramis primariis brevissimis vel obsoletis, floribus sessilibus ad apices ramulorum capitato-congestis; bracteae oblongae, ovales vel obovatae, apice acutae vel rotundatae, 3–4 mm. longae, sparse adpresso-pilosulae, dense et conspicue ciliatae; calyx extus densissime breviterque hirsutus; fructus immaturus hispidulus.—Ecuador: Chacayacu, western Andes of Cuenca, alt. 1,000–1,800 m., *F. C. Lehmann 5602* (Herb. Field Mus. No. 578,071, type; duplicate in K). Ad radices Chimborazo, alt. 900 m., August, 1860, *Spruce 6189* (K); a shrub 3 m. high.—Colombia: Las Dantas to Puerto Canoa, on Río Esmeralda, Bolívar, 400–800 m., *Pennell 4518* (W, Y). Damp forest ravine, by a stream, Valparaíso, 1,350 m., *H. H. Smith 2796* (Y).

The plant is a close relative of *P. daguensis* Standl., of Colombia, but it appears substantially different in the broad thin leaves and large stipules.

**Psychotria luxurians** Rusby, Mem. Torrey Club 6: 50. 1896. *Palicourea membranifolia* Schum. & Krause, Bot. Jahrb. Engler 40: 333. 1908.

Western Andes of Naranjal, 500 m., *Lehmann 6678* (K). Type of *P. membranifolia* collected above Naranjal, on the western slope of the western Andes, in dense wet forest at 200–600 m., *Lehmann 6671* (photo. and fragm. of type, ex Herb. Berol., in F). Ranging southward to Bolivia.

A shrub or small tree 5 m. high; stipules triangular, 4–5 mm. long, bidentate at the apex; leaves short-petiolate, thinly membranous, oblong or ovate-oblong, acuminate, at the base cuneate, 9–16 cm. long and 3.5–6 cm. wide, glabrous, the lateral nerves about 12 pairs; panicles long-pedunculate, many-flowered, the bracts filiform, 6–8 mm. long; flowers short-pedicellate; calyx lobes broadly triangular, acute; corolla yellow, glabrous, 6 mm. long.

**Psychotria macrophylla** R. & P. Fl. Peruv. 2: 56. *pl. 202, f. a.* 1799. *P. anomothyrsa* Schum. & Donn. Smith, Bot. Gaz. 35: 3. 1903.

Near Niebli, *Sodiro 48-32* (photo. and fragm. ex Herb. Berol., in F). El Recreo, *Eggers 15119* (F, W). Teresita, Prov. Guayas, 270 m., *Hitchcock 20416* (W, Y). Near Tamompeque, *Eggers 14861* (F).

Tandapi, Prov. Pichincha, 1,500 m., *Holmgren 822* (S). Ranging southward to Bolivia and northward to Mexico.

Stems simple, glabrous, suffrutescent, sometimes 2.5 m. high; stipules short, broad, apiculate, caducous; leaves large, petiolate, elliptic to lance-oblong, acuminate, at the base acute to attenuate, glabrous or nearly so; inflorescence glabrous or pruinose-puberulent, axillary, pedunculate, paniculate, the branches often reflexed, the flowers sessile; calyx denticulate; corolla whitish, glabrous, 4–5 mm. long; fruit white, glabrous, 4–5 mm. long.

**Psychotria madida,** sp. nov.—Ramuli crassi sparse minuteque puberuli vel glabrati; stipulae deciduae, non visae; folia opposita, petiolo gracili 2–3 mm. longo puberulo vel glabrato; lamina obovata vel oblongo-elliptica, 20–21 cm. longa, 8–10 cm. lata, acuta vel obtusa, basin versus longe angustata et decurrens, rarius subobtusa, herbacea, marginata, supra viridis, asperula, nervis manifestis sed vix elevatis, subtus fusco-brunnescens, asperula, ad nervos minute puberula, costa crassa, nervis lateralibus utroque latere c. 15, prominentibus, gracilibus, angulo lato adscendentibus, arcuatis, marginem attingentibus, nervulis fere obsoletis; inflorescentia axillaris 5–6 cm. longe pedunculata late cymoso-paniculata, c. 4 cm. longa et 5 cm. lata, dense multiflora, pedunculo puberulo, ramis oppositis divaricatis validis dense puberulis, floribus sessilibus dense congestis; bracteae oblongae vel ovatae 3–5 mm. longae acutae vel obtusae puberulae; calyx 2.5–3 mm. longus profunde 5-lobus, lobis oblongis vel obovatis obtusis vel apice rotundatis puberulis vel glabratis; corolla tubulosa 8 mm. longa sparse puberula vel fere glabra, tubo 2.5 mm. lato, lobis brevissimis; fructus subglobosus compressus glaber 5–6 mm. longus profunde sulcatus, costis acutis.—Ecuador: Vicinity of Huigra, September 3, 1918, *J. N. and G. Rose 22507* (U. S. Nat. Herb. No. 1,022,160, type; photo. in F; duplicates in G and Y). Tandacato, Prov. Pichincha, 2,500 m., *Heilborn 496* (S).

Near *P. Hartwegiana* Standl., but differing in the large calyx, longer corolla, and well-developed bracts.

**Psychotria magnoliaefolia** HBK. Nov. Gen. & Sp. 3: 360. 1820, non H. & B. ex R. & S., 1819.

Based on a specimen ascribed doubtfully to Ecuador.

A nearly glabrous shrub; stipules oblong, rounded at the apex, as long as the petioles, caducous; leaves petiolate, elliptic, acute or short-acuminate, at the base acute, 15–20 cm. long, 10–12.5 cm. wide, glabrous; inflorescence terminal, pedunculate, cymose-paniculate, radiately branched at the base, the bracts minute; flowers sessile; calyx obsoletely 5-dentate; corolla glabrous, the tube short, the throat villous.

The authors of this species state that it is close to *P. ardisiaefolia* HBK., a synonym of *P. alba* R. & P. There is at hand a photograph of an authentic specimen from the Willdenow Herbarium at Berlin.

Although the photograph is a good one, the status of the plant is doubtful, and it is probably not *P. alba*. I have not renamed the species because it is altogether uncertain whether it is a valid one or not. The doubt regarding the locality from which the material came, as in the case of other species published in the same work, does not simplify the matter of identification.

**Psychotria microdon** (DC.) Urban, Repert. Sp. Nov. 9: 539. 1928. *Rondeletia microdon* DC. Prodr. 4: 408. 1830. *P. pinularis* Sessé & Moc. Fl. Mex. ed. 2. 57. 1894.

El Recreo, *Eggers 15723* (F, K, L, W). Balao, *Eggers 14617* (L, W). Chonana, near Guayaquil, *Spruce 6270* (K). Río Daule, near Guayaquil, *Spruce 6270* (B, L). Ranging to the Guianas, Colombia, Mexico, and Cuba.

**Psychotria racemosa** (Aubl.) Willd. Sp. Pl. 1: 966. 1797. *Nonatelia racemosa* Aubl. Pl. Guian. 1: 187. *pl. 72*. 1775.

Teresita, Prov. Guayas, 270 m., *Hitchcock 20514* (W, Y). Widely distributed in South America, and extending to Panama.

A shrub 1.5 m. high, the branches puberulent; stipules biparted, the segments linear-subulate, green, persistent; leaves short-petiolate, oblong-elliptic, acuminate, at the base usually abruptly contracted, nearly glabrous; inflorescence terminal, thyrsiform, short-pedunculate, the short branches minutely hirtellous; flowers sessile; calyx lobes linear-lanceolate; corolla hirtellous; fruit 4–5-celled, sulcate, 4 mm. long.

This species is easily recognized by the 4–5-celled fruit, that of most species of *Psychotria* being 2-celled.

**Psychotria rufescens** H. & B. ex R. & S. Syst. Veg. 5: 192. 1819. *P. micrantha* HBK. Nov. Gen. & Sp. 3: 363. *pl. 284*. 1820.

El Recreo, *Eggers 15657* (F, K, L, W). Without locality, *Eggers 15176* (F). Ranging northward to Central America; Peru.

A shrub or small tree, the branches rufous-hirsute; stipules large, brown, bidentate, caducous; leaves petiolate, oblong to oblong-elliptic, acuminate, acute or attenuate at the base, softly pubescent; inflorescence terminal, pedunculate, open-paniculate, radiately branched; calyx lobes deltoid, obtuse; corolla white or whitish, 3 mm. long, pubescent; fruit 4 mm. long, pubescent.

**Psychotria rufipes** Hook. f. Trans. Linn. Soc. 20: 220. 1847.

Type from James Island, Galapagos Islands; reported also from Albemarle, Charles, Chatham, and Indefatigable Islands.

Stipules large, broadly ovate, entire; leaves petiolate, obovate-lanceolate, obtuse, attenuate at the base, glabrous above, rufous-tomentose beneath; inflorescence terminal and axillary, short, paniculate, rufous-tomentose, the flowers short-pedicellate; corolla villous, the throat barbate.

**Psychotria rugulosa** HBK. Nov. Gen. & Sp. 3: 356. 1820.

Loja, *Rose, Pachano & Rose 23245* (W, Y). Also in Colombia and in Peru (?).

A nearly glabrous shrub; stipules oblong, thin, brown, acuminate, caducous; leaves petiolate, lanceolate or oblong-lanceolate, long-acuminate, attenuate to the base, finely puberulent beneath along the nerves, the nerves impressed above; inflorescence terminal, pedunculate, cymose-paniculate, radiately branched at the base, the branches glabrous or minutely puberulent; bracts deciduous; flowers sessile; calyx denticulate; corolla glabrous outside, 5 mm. long, the lobes acutish, equaling the tube; fruit globose, glabrous, red, 4 mm. long.

**Psychotria viridis** R. & P. Fl. Peruv. 2: 61. *pl. 210, f. b.* 1799. *P. glomerata* HBK. Nov. Gen. & Sp. 3: 362. 1820.

Balao, in forest, *Eggers 14476* (L, W). Ranging south to Bolivia and north to Central America and Cuba.

A glabrous tree 3.5 m. high; stipules large, acuminate, thin, brown, caducous; leaves short-petiolate, obovate or obovate-oblong, acute or short-acuminate, cuneate-attenuate to the base; inflorescence terminal, pedunculate, spicate-paniculate, the lower branches verticillate, the minute flowers sessile in distant glomerules; corolla greenish white; fruit red.

## 35. PALICOUREA Aubl.

**Palicourea angustifolia** HBK. Nov. Gen. & Sp. 3: 367. 1820.

Tungurahua, 1,950 m., *Spruce 5118* (K). Eastern Andes, 1,800–2,400 m., *collector unknown, No. 347* (K). Also in Colombia, Venezuela, and Peru.

A shrub or small tree, the branchlets densely puberulent or rarely glabrous; stipule sheath 4–6 mm. long, the lobes subulate, erect, equaling or longer than the sheath; leaves short-petiolate, oblong or oblong-lanceolate, 6–15 cm. long, long-acuminate, at the base obtuse or acute, usually puberulent or pilose beneath, at least on the veins; panicles pedunculate, thyrsiform, many-flowered, open or dense, the branches densely puberulent or pilose, the bracts minute; flowers pedicellate; calyx minute, acutely dentate; corolla tubular, 10–15 mm. long, violet or purple, commonly puberulent or short-pilose; fruit 4–5 mm. long, purple-black.

**Palicourea aragmatophylla** Schum. & Krause, Bot. Jahrb. Engler 40: 332. 1908.

Type from the western slope of the western Andes, near Cuenca, in dense forest, at 2,000–2,500 m., *Lehmann 6676* (photo. and fragm. of type, ex Herb. Berol., in F).

A shrub or small tree 5 m. high, the branches puberulent below the nodes; stipules large, the sheath 8–10 mm. long, the lobes subulate, equaling the sheath; leaves opposite, petiolate, rigid-coriaceous,

oblong or oblong-lanceolate, acuminate, at the base cuneate, 10–17 cm. long, 3–6 cm. wide, glabrous; panicles pedunculate, subpyramidal, lax, 10–12 cm. long, the branches puberulent, the bracts subulate; flowers short-pedicellate; calyx lobes oblong, obtuse; corolla blue, 12–14 mm. long, minutely papillose.

**Palicourea balnearia,** sp. nov.—Frutex, ramulis crassis olivaceis subteretibus glabris, internodiis 1.5–3 cm. longis; stipulae persistentes adpressae in vaginam truncatam glabram 2–4 mm. longam connatae, vagina in lobos 4 remotos triangulares acutos 1–2 mm. longos glabros desinente; folia opposita, petiolo valido 6–9 mm. longo glabro; lamina subcoriacea, oblongo-elliptica, 6.5–10 cm. longa, 2.5–3.5 cm. lata, abrupte breviterque acuminata, acumine triangulari obtuso, basi acuta vel subobtusa, saepe bullata, utrinque glabra, angustissime marginata, supra viridis, nervis manifestis sed non elevatis, subtus luteo-viridis, costa crassiuscula elevata, nervis lateralibus utroque latere c. 11, angulo lato adscendentibus, gracilibus, prominentibus, arcuatis, prope marginem conjunctis; inflorescentia terminalis 3.5 cm. longe pedunculata, cymoso-paniculata, c. 5 cm. longa et lata, dense multiflora, multiramosa, ramis basalibus pseudoverticillatis crassis glabris, patentibus vel subadscendentibus, pedicellis crassis glabris 1–3 mm. longis, bracteis triangularibus acutis 2–3 mm. longis glabris; hypanthium cylindraceo-turbinatum 1.5 mm. longum glabrum; calyx glaber 1 mm. longus breviter 5-lobus, lobis rotundato-ovatis inaequalibus obtusis minute ciliolatis; corolla 15–16 mm. longa extus glabra, tubo crasso basi ampliato, superne dilatato, ore 5 mm. lato, lobis 5 oblongo-triangularibus obtusis 3 mm. longis intus minute papillosis; antherae oblongae semiexsertae; fructus subglobosus 6 mm. diam. glaber, pyrenis dorso obtuse costatis.—Ecuador: Baños, Prov. Tungurahua, alt. 1,800 m., February 28, 1920, *O. Heilborn 386* (Stockholm Herb., type).

A species with no outstanding characters, but not agreeing with any other known from Ecuador.

**Palicourea calantha,** sp. nov.—Frutex, ramulis gracillimis teretibus viridibus glabris, internodiis 5–7 cm. longis; stipulae persistentes in vaginam glabram truncatam 1.5–2 mm. longam connatae, vagina in lobos 2 erectos 1–1.5 mm. longos distantes lineari-triangulares acutiusculos desinente; folia opposita, petiolo gracili 6–23 mm. longo glabro; lamina membranacea, anguste elliptico-oblonga vel lanceolato-oblonga, 8.5–16 cm. longa, 2.5–4.5 cm. lata, longissime acuminata, acumine angusto longe attenuato, basin versus angustata et acuminata, supra glabra, laete viridis, costa vix elevata, nervis subimpressis, subtus fere concolor, ad nervos sparse pilis brevibus albidis patentibus hispidula, aliter glabra, costa gracili elevata, nervis lateralibus utroque latere c. 16, angulo lato adscendentibus, gracillimis, valde arcuatis, prominentibus, in marginem desinentibus, nervulis vix prominulis laxe reticulatis; inflorescentia terminalis 3.5–5 cm. longe pedunculata, late pyramidali-paniculata, 7–11 cm. longa, 12–17 cm.

lata, laxe multiflora, basi trichotoma, ramis infimis late divaricatis gracilibus glabris, superioribus fasciculato-ramosis et suberectis, panicula interdum basi foliaceo-bracteata, pedicellis gracilibus plerumque 5–12 mm. longis glabris, bracteis subulatis glabris 2–4 mm. longis; hypanthium turbinatum 1 mm. longum glabrum; calyx glaber 0.5–0.8 mm. longus viridis, lobis late triangularibus obtusis; corolla pallide lutea extus glabra in alabastro obtusa, tubo crasso 14 mm. longo superne paullo dilatato, ore 4–4.5 mm. lato, saepe valde curvo vel e basi recurvo, lobis ovato-oblongis 3–3.5 mm. longis acutiusculis; stylus apice exsertus.—Ecuador: Tandapi, Prov. Pichincha, in forest and along roadsides, alt. 1,500 m., July, 1920, *O. Heilborn 777* (Herb. Field Mus. No. 605,122, type; duplicate in Stockholm herb.). Pululahua, *Sodiro 84-20* (photo. and fragm. ex Herb. Berol. in herb. Field Mus.).

The plant is one of the most distinct members of the genus *Palicourea*, and must be a very handsome shrub when growing. It is noteworthy for the large and unusually broad panicles with their peculiar branching, and particularly for the form of the corolla. The corolla tube is usually strongly curved and often it is abruptly recurved from the base, the flowers thus appearing nutant.

**Palicourea calothyrsus** Schum. & Krause, Bot. Jahrb. Engler 40: 334. 1908. *P. fragilior* Wernham, Journ. Bot. 55: 282. 1917. *P. hedyotoides* Wernham, op. cit. 339. 1917.

Eastern slope of the eastern Andes, near Sigsig, 1,800–2,000 m., *Lehmann 6497* (F, W, type collection; photo. of type, ex Herb. Berol., in F). In woods, Talancay, along Río Chanchan, *Spruce 6010* (F, G, K, L, S, type collection of *P. fragilior*). In valle Lloensi, inter arbores, 2,700 m., *Jameson 336* (G, type collection of *P. hedyotoides*). Carmen, 2,250 m., *Tate 479* (W). Niebli, *André K503* (K, Y). Tambo de Sabanilla, *André 4588* (K, Y). Quitensian Andes, in 1855, *Couthouy* (G). Huigra, *Rose & Rose 22506* (G, W, Y). Guayan, Valley of Lloa, near Quito, *Jameson* (K). Tandacato, Prov. Pichincha, 2,500 m., *Heilborn 493* (S).

A slender, nearly glabrous shrub 2 m. high; stipule sheath about 2 mm. long, bidentate; leaves opposite, petiolate, firm, small, lanceolate or elliptic-oblong, 6–13 cm. long, 1.5–4 cm. wide, long-acuminate, at the base acute, many-nerved, glabrous or sparsely hirtellous beneath along the costa; panicles sessile or pedunculate, pyramidal, lax, the branches ascending, glabrous, the bracts sometimes leaflike but mostly setaceous and inconspicuous; flowers slender-pedicellate, often appearing umbellate; calyx lobes oblong, obtuse; corolla yellow, glabrous, 8–10 mm. long.

**Palicourea calycina** Benth. Pl. Hartw. 133. 1844.

Type from mountains of Loja, *Hartweg*. Loja, *Seemann 889* (K).

A shrub 1.5–2.5 m. high; stipule sheath 4–6 mm. long, truncate, the lobes subulate, longer than the sheath; leaves elliptic-oblong or

obovate-oblong, 10–15 cm. long, acuminate, at the base acute, pubescent beneath on the nerves; panicles pedunculate, small, dense, many-flowered, the bracts linear or lanceolate, often exceeding the calyx; flowers sessile; calyx lobes linear-oblong, foliaceous, 5 mm. long, hirtellous; corolla tubular, 12–14 mm. long, villous or hirsute.

**Palicourea chimboracensis,** sp. nov.—Arbuscula 3.5-metralis vage ramosa, ramulis gracilibus teretibus viridibus glabris, internodiis c. 3.5 cm. longis; stipulae in vaginam adpressam 4–6 mm. longam truncatam glabram connatae, vagina in lacinias 4 remotas anguste triangulares glabras obtusas 1.5–2 mm. longas desinente; folia opposita, petiolo gracili 12–17 mm. longo glabro; lamina membranacea, elliptico-oblonga vel obovato-oblonga, 14.5–16 cm. longa, 6–7 cm. lata, apice obtusa vel rotundata et breviter acuminata, acumine triangulari obtuso 5–7 mm. longo, basi acuta vel acuminata, supra viridis, glabra, costa prominente, nervis non elevatis, subtus pallidior, ad nervos et praesertim ad costam pilis debilibus albidis brevibus sparse pilosula, aliter glabra, costa gracili elevata, nervis lateralibus utroque latere c. 13, gracillimis, angulo lato adscendentibus, prominentibus, arcuatis, in marginem desinentibus, nervulis vix prominulis laxe reticulatis; inflorescentia terminalis 3–4 cm. longe pedunculata thyrsoideo-paniculata, laxe multiflora, 8–12 cm. longa, c. 7.5 cm. lata, ramis basalibus oppositis gracilibus, angulo lato adscendentibus, angulatis, glabris, purpureis, floribus laxe cymosis pedicellatis, pedicellis gracilibus rectis 2–8 mm. longis glabris, bracteis subulatis vel anguste triangularibus 2–4 mm. longis acutis glabris; hypanthium subglobosum 2 mm. longum glabrum; calyx glaber 1 mm. longus brevissime lobatus, lobis latissimis late rotundatis; corolla lutea extus glabra 22–26 mm. longa, basi valde ampliato 6–7 mm. lato, superne non dilatato, ore 4 mm. lato, lobis 5 triangulari-oblongis 3 mm. longis obtusis intus minute papillosis; stylus breviter exsertus; fructus globosus niger 6–7 mm. longus glaber.—Ecuador: At the foot of Mt. Chimborazo, alt. 900 m., July, 1860, *R. Spruce 6182* (Herb. Kew., type; photo. in herb. Field Mus.).

**Palicourea cyclotis,** sp. nov.—Frutex 3-metralis, ramulis gracilibus obtuse tetragonis glabris; stipulae 7 mm. longae fere liberae profunde bilobae, lobis late rotundatis extus scaberulis ciliolatis; folia opposita, petiolo gracili 1.5–4 cm. longo glabrato; lamina papyracea, ovali-elliptica, 15–18 cm. longa, 9–11 cm. lata, abrupte breviterque acuminata, acumine lato obtuso, basi obtusa, supra viridis, glabra, nervis non elevatis, subtus pallida, secus costam hinc inde hirtella vel glabra, costa gracili elevata, nervis lateralibus utroque latere c. 15, gracillimis, prominentibus, angulo lato adscendentibus, arcuatis, prope marginem conjunctis, nervulis obscuris; inflorescentia 5 cm. longe pedunculata anguste pyramidali-paniculata, 27 cm. longa, 20 cm. lata, laxe multiflora, ramulis gracilibus divaricatis vel adscendentibus angulatis sparsissime minuteque puberulis; bracteae oblongae vel anguste triangulares, obtusae vel acutae, 2–4 mm. longae, glabrae, ciliolatae; flores sparsi graciliter pedicellati, pedicellis 5–11 mm. longis;

hypanthium turbinatum 1.5 mm. longum glabrum; calyx glaber 2 mm. longus, 3–4.5 mm. latus, profunde 5-lobus, lobis ovalibus vel rotundatis; corolla intense purpurea extus glabra tubuloso-infundibuliformis, tubo basi paullo ampliato superne dilatato, fauce 5 mm. lato, lobis ovato-oblongis acutis 4–4.5 mm. longis intus glabris; antherae lineares semiexsertae.—Ecuador: Valley of the Pastaza River, between Baños and Cashurco, alt. 1,300–1,800 m., September 25, 1923, *A. S. Hitchcock 21805* (U. S. Nat. Herb. No. 1,196,528, type; photo. in herb. Field Mus.).

In stipule form this is similar to *P. vaginata* Benth. It differs from that species in the longer corolla, elongate panicle, and peculiar calyx. The flowers of *P. vaginata* are yellow.

**Palicourea egena,** sp. nov.—Frutex, ramulis validis densissime pilis brevibus ochraceis hispidulo-tomentosis, internodiis 1.5–2.5 cm. longis; stipulae persistentes in vaginam 5–7 mm. longam truncatam densissime puberulam connatae, vagina in lobos 4 erectos lineares puberulos 6–7 mm. longos desinente; folia opposita, petiolo crasso 7–10 mm. longo hispidulo-tomentoso; lamina elliptico-oblonga, 8–12 cm. longa, 3.3–4.5 cm. lata, acuta, basi cuneatim angustata, rigide coriacea, supra viridis, dense et minute hispidula, costa prominente, nervis non elevatis, subtus luteo-viridis, undique dense pilis brevibus albidis patentibus hispidula, costa crassa elevata, nervis lateralibus utroque latere c. 18, gracilibus, elevatis, angulo lato adscendentibus, arcuatis, marginem attingentibus, nervulis prominulis arcte reticulatis; inflorescentia terminalis 2.5 cm. longe pedunculata cymoso-paniculata dense multiflora, 8 cm. longa et lata, e basi trichotoma, ramis adscendentibus vel suberectis validis dense ochraceo-hispidulis, floribus congestis, pedicellis 1–3 mm. longis hispidulis, bracteis oblongis vel linearibus 2–6 mm. longis, obtusis vel acutis, hispidulis; hypanthium obovoideum 1.2 mm. longum hispidulum; calyx 1.2 mm. longus, lobis 5 oblongo-ovatis obtusis minute hispidulis; corolla 8 mm. longa extus dense hispidula, tubo valido superne sensim dilatato ore 3 mm. lato, lobis triangulari-oblongis 2.5 mm. longis obtusis.—Ecuador: Province of Pasto, September, 1845, *Jameson 427* (Herb. Kew., type).

The plant is somewhat noteworthy because of the combination of thick, multicostate, densely pubescent leaves, short, dense, many-flowered inflorescence, and densely pubescent corolla.

**Palicourea flavescens** HBK. Nov. Gen. & Sp. 3: 366. 1820. *Psychotria flavescens* Spreng. Syst. Veg. 1: 744. 1825. *Palicourea ochreata* Wernham, Journ. Bot. 55: 281. 1917.

Without definite locality, *Humboldt & Bonpland* (photo. of type, ex Herb. Berol., in F). Type of *P. ochreata* from Mt. Tulcán, Prov. Carchi, 3,000 m., *Lehmann 669*. Molleturo, Cuenca, 2,500–2,800 m., *Lehmann 5654* (F, B, K, W, Y). Andes, 1,500–1,800 m., *Pearce* (K).

Branches densely villous-tomentose; stipule sheath 1–1.5 cm. long, truncate, the distant subulate lobes 3–4 mm. long; leaves opposite, short-petiolate, firm, elliptic-lanceolate or oblong-lanceolate, long-acuminate, narrowed to the acute base, densely hispidulous-pubescent on both surfaces; panicles thyrsiform, pedunculate, up to 10 cm. long, the branches spreading, densely pubescent, the bracts small and inconspicuous; corolla sparsely pubescent, the tube 6–7 mm. long, the lobes ovate, 2 mm. long.

In the original publication of *Palicourea flavescens*, the locality is given doubtfully as Peru, and it may be that the specimen came from that country. Schumann, who had the type before him, referred *Lehmann 5654* to *P. flavescens*, and this number seems to match exactly the photograph of the type seen by the writer.

**Palicourea graciliflora**, sp. nov.—Frutex 2.5–3-metralis, ramis gracilibus teretibus glabris vel in partibus novellis sparse puberulis, internodiis plerumque 2–5 cm. longis; stipulae persistentes glabrae in vaginam latam 4–6 mm. longam truncatam connatae, vagina in lobos 4 lineares vel anguste triangulares 2–6 mm. longos remotos desinente; folia opposita, petiolo valido 7–17 mm. longo glabro vel sparse puberulo; lamina crasse membranacea, oblonga, elliptico-oblonga vel obovato-oblonga, 11–22 cm. longa, 4.5–9 cm. lata, abrupte acuminata, acumine 1.5–2 cm. longo angusto attenuato, basi acuta, supra viridis, glabra, costa prominente, nervis non elevatis, subtus pallidior, ad nervos pilis minutis adscendentibus vel adpressis pilosula, costa gracili elevata, nervis lateralibus utroque latere c. 24, gracillimis, angulo lato adscendentibus, arcuatis, marginem attingentibus, nervulis prominulis laxe reticulatis; inflorescentia terminalis thyrsoidea laxe multiflora, 16–20 cm. longa et ultra, 6–16 cm. lata, 5–7.5 cm. longe pedunculata, ramis brevibus sparse breviterque pilosis patentibus vel saepe recurvis, floribus pedicellatis, pedicellis plerumque 3–4 mm. longis gracilibus, bracteis subulatis vel linearibus 1–3 mm. longis; hypanthium obovoideum vix 1 mm. longum puberulum vel glabratum; calyx 0.5 mm. longus minute 5-dentatus, dentibus ovatis subacutis; corolla purpureo-caerulea gracilis 1.5–2.2 cm. longa, in alabastro apice obtusa, extus sparsissime puberula vel hirtella, tubo lineari basi subampliato, superne paullo dilatato, ore 2.5 mm. lato, lobis oblongis obtusis 2.5 mm. longis; stylus capillaris glaber.—Ecuador: Andes of Cuenca, alt. 1,200 m., *Pearce 335* (Herb. Kew., type; photo. in F).—Colombia: Maldonado, Ocaña to Pamplona, Dec. 25, 1878, *Kalbreyer 864* (K).

Remarkable for the long and very slender corolla and for the narrow thyrsoid inflorescence.

**Palicourea guianensis** Aubl. Pl. Guian. 1: 173. *pl. 66.* 1775.

Portovelo, *Holway 1001* (W). Without locality, *Pearce* (K). Base of Mount Chimborazo, 900 m., *Spruce 6181* (K). Widely distributed in tropical America.

A shrub or small tree 2.5–6 m. high, nearly glabrous; stipules 8–10 mm. long, biparted, the lobes lanceolate or ovate, obtuse; leaves short-petiolate, large, thin, elliptic-oblong to ovate or elliptic, acuminate, at the base acute to nearly rounded; panicles pedunculate, dense, many-flowered, large, the branches ascending or spreading, glabrous or puberulent, the bracts subulate, inconspicuous; flowers pedicellate; calyx lobes minute, deltoid, acute or obtuse; corolla orange-red or yellow, 10–18 mm. long, furfuraceous-tomentose or glabrate; fruit ovoid, 4–5 mm. long.

**Palicourea Heilbornii**, sp. nov.—Frutex, ramulis crassis teretibus glabris, internodiis c. 4 cm. longis; stipulae in vaginam 6–7 mm. longam glabram truncatam connatae, vagina in lacinias 4 lineares obtusas glabras 5 mm. longas erectas desinente; folia opposita, petiolo crasso 2 cm. longo glabro; lamina crasse chartacea, ovali-elliptica, 15–18 cm. longa, 8–9.5 cm. lata, abrupte acuta vel breviter acuminata, acumine triangulari acuto, basi rotundata vel acuta, supra olivaceo-viridis, glabra, costa prominente, nervis non elevatis, subtus fere concolor, ad costam crassam elevatam sparsissime pilis albidis pilosa, aliter glabra, nervis lateralibus utroque latere c. 15, prominentibus, angulo lato adscendentibus, gracilibus, arcuatis, in marginem desinentibus, nervulis vix prominulis arcte reticulatis; inflorescentia terminalis 4 cm. longe pedunculata thyrsoideo-paniculata, 10 cm. longa et aequilata, laxe multiflora, ramis basalibus oppositis rigidis crassis glabris, angulo lato adscendentibus, pedicellis crassis 6–15 mm. longis glabris, bracteis anguste triangularibus 2–4 mm. longis acutis glabris; hypanthium late campanulatum glabrum 2 mm. longum; calyx 3 mm. longus, glaber, laciniis ovalibus vel late ovatis apice rotundatis vel obtusissimis; corolla coccinea extus glabra 2.3 mm. longa, tubo crasso basi paullo ampliato superne sensim dilatato ore 5 mm. lato, lobis 5 anguste triangularibus 5 mm. longis obtusis intus minutissime papillosis; antherae semiexsertae.—Ecuador: Tandapi, Prov. Pichincha, in silva primaeva, alt. 1,500 m., July, 1920, *O. Heilborn 773* (Stockholm Herb., type).

The plant may be recognized by the combination of large, nearly glabrous leaves, ample inflorescence, large calyx lobes, and long stout corolla.

**Palicourea Holmgrenii**, sp. nov.—Ramuli crassiusculi virides subteretes subdense pilis debilibus albidis villosuli, internodiis 2.5–6 cm. longis; stipulae in vaginam persistentem 3–4 mm. longam ferrugineam fere glabram truncatam connatae, vagina in lobos 4 erectos lineares 3–4 mm. longos acutos ciliatos desinente; folia opposita, petiolo valido 6–15 mm. longo dense villosulo vel hispidulo; lamina chartacea, ovato-oblonga vel anguste ovata, 6–10 cm. longa, 2.5–4 cm. lata, longissime acuminata, acumine angusto longe attenuato, basi obtusa vel subrotundata, rarius abrupte contracta, supra olivaceo-viridis, in statu juvenili rhaphidibus minutis brevibus pallidis conspersa, ad costam et interdum ad nervos hispidula, aliter

glabra, nervis non elevatis, subtus pallida, ad nervos dense villosa et hispidula, inter nervos glabra, costa crassa elevata, nervis lateralibus utroque latere c. 16, angulo lato adscendentibus, gracilibus, prominentibus, valde arcuatis, in marginem desinentibus, nervulis reticulatis subimpressis; inflorescentia terminalis sessilis et basi foliata vel 2.5 cm. longe pedunculata, late pyramidali-paniculata, dense multiflora, c. 6 cm. longa et 6–8 cm. lata, basi trichotoma, ramis validis patentibus vel adscendentibus dense hispidulis, floribus cymosis 1–2 mm. longe pedicellatis, pedicellis hispidulis, bracteis linearibus vel lanceolatis attenuatis 3–4 mm. longis hispidulis et ciliatis viridibus; hypanthium late turbinatum 1.2 mm. longum sparse hispidulum vel fere glabrum; calyx 1.2 mm. longus, lobis late ovatis acutis glabris; corolla caeruleo-violacea 9 mm. longa extus sparse villosula, tubo basi ampliato et 4 mm. lato, versus apicem sensim dilatato et ore 3 mm. lato, lobis oblongis obtusis 2 mm. longis; stylus breviter exsertus; fructus obovoideo-globosus 5 mm. longus glabratus, pyrenis obtuse costatis.—Ecuador: Tandacato, Prov. Pichincha, in silva primaeva, alt. 2,500 m., April 6, 1920, *I. Holmgren 469* (Herb. Field Mus. No. 605,119, type; duplicate in Stockholm herb.).

**Palicourea hospitalis,** sp. nov.—Frutex 2–3-metralis, ramulis gracilibus viridibus obtuse tetragonis dense minuteque puberulis, internodiis 6–7 cm. longis; stipulae virides persistentes 10–13 mm. longae, basi breviter connatae, dense ochraceo-strigillosae, profunde bifidae, laciniis oblongo-ovatis obtusis; folia opposita, petiolo gracili 2–2.5 cm. longo dense minuteque sericeo-strigilloso; lamina membranacea, elliptica vel ovato-elliptica, 12–17 cm. longa, 6–8 cm. lata, acuta vel abrupte acuta, basi acuta vel cuneatim acuta, supra luteo-viridis, glabra, costa nervisque prominulis, subtus paullo pallidior, minute adpresso-pilosula, ad costam gracilem elevatam et ad nervos pilis longioribus subadpressis pilosa, nervis lateralibus utroque latere c. 20, gracilibus, prominentibus, angulo lato adscendentibus, arcuatis, in marginem desinentibus, nervulis prominulis arcte reticulatis; inflorescentia terminalis 5 cm. longe pedunculata, late pyramidali-paniculata, laxe multiflora, 16 cm. longa et aequilata, basi trichotoma et foliis reductis bracteata, pedunculo erecto strigilloso, ramis basalibus oppositis angulo recto divergentibus, superioribus abbreviatis, sparse puberulis, floribus plerumque 1–2 mm. longe pedicellatis, bracteis linearibus vel lanceolatis 2–6 mm. longis extus strigillosis; hypanthium late obovoideum 1–1.2 mm. longum glabrum; calyx glaber 1–1.2 mm. longus 5-fidus, laciniis inaequalibus oblongis vel lanceolato-oblongis obtusis vel acutiusculis; corolla lutea crassa in alabastro apice rotundata et 2.5 mm. longa, aperta non visa.—Ecuador (?): Tambo de Sabanilla, December 18, 1876, *Ed. André 4566* (Herb. Kew., type; photo. in herb. Field Mus.).

Closely similar in general appearance to *P. Kalbreyeri* Standl., of Colombia, but with very different stipules and much broader leaves.

**Palicourea huigrensis,** sp. nov.—Arbor 5.5 m. alta ramosa, ramulis gracilibus obtuse tetragonis hispidulis vel glabratis olivaceis,

internodiis brevibus vel elongatis; stipulae in vaginam 5–6 mm. longam laxam truncatam dense adpresso-pilosulam connatae, vagina in lobos 4 approximatos oblongo-lineares 5–7 mm. longos obtusos desinente; folia opposita, petiolo valido 1–2 cm. longo hispidulo vel glabrato; lamina subcoriacea, elliptico-oblonga, elliptica vel obovato-oblonga, 8–13.5 cm. longa, 4–5.5 cm. lata, anguste acuminata, acumine obtuso, basi angustata, supra viridis, ad costam subimpressam pilosa, nervis subimpressis, subtus paullo pallidior, praesertim ad nervos dense breviterque pilosa vel villosula, costa valida elevata, nervis lateralibus utroque latere c. 16, prominentibus, angulo lato adscendentibus, arcuatis, marginem attingentibus, nervulis prominulis reticulatis; inflorescentia 6–7.5 cm. longe pedunculata pyramidali-paniculata dense multiflora, 7–8 cm. longa, 4.5–6 cm. lata, ramulis divaricatis vel adscendentibus sparse puberulis crassiusculis; bracteae oblongae vel lanceolatae, obtusae vel acutae, 2–3.5 mm. longae, ciliolatae; flores sparsi, pedicellis crassis 1.5–6 mm. longis apice vix incrassatis; hypanthium 1.5 mm. longum late turbinatum glabrum; calyx glaber 1.5 mm. longus profunde 5-lobus, lobis late ovatis vel rotundatis; corolla violacea vel caerulea tubulosa extus glabra 16–17 mm. longa, tubo crasso basi paullo ampliato, superne vix dilatato, fauce 4 mm. lato, lobis ovatis subacutis 2–2.5 mm. longis; stylus exsertus minute puberulus.—Ecuador: Near Huigra, September 3, 1918, *J. N. and G. Rose 22515* (U. S. Nat. Herb. No. 1,022,167, type; duplicate in Y; photo. in herb. Field Mus.). In sylvis Llalla ad pedem montis Azuay, August, 1859, *Spruce 6003* (F, K, L).

**Palicourea Jamesonii,** sp. nov.—Ramuli graciles teretes, vetustioribus ochraceis laevibus, novellis pilis brevibus incurvis basi dilatatis furfuraceo-puberulis; stipulae virides persistentes in vaginam 1–1.5 mm. longam sparse puberulam vel glabratam truncatam connatae, vagina in lacinias 4 erectas lineari-oblongas 1–2 mm. longas ciliolatas desinente; folia opposita, petiolo 3–5 mm. longo supra sulcato puberulo; lamina subcoriacea, anguste elliptica, ovato-oblonga vel lanceolato-oblonga, 2.5–5.5 cm. longa, 0.8–2 cm. lata, acuminata, basi acuta vel subobtusa, supra viridis, ad costam prominulam sparse breviterque pilosa, aliter glabra, nervis non elevatis, subtus pallidior, ad costam crassiusculam elevatam aciculari-pilosula, aliter glabra, nervis lateralibus utroque latere c. 7, gracilibus, prominentibus, angulo angusto adscendentibus, arcuatis, in marginem desinentibus; inflorescentia terminalis vel pseudo-axillaris 1–3 cm. longe pedunculata, plerumque 4–7-flora, densa, pedunculo gracili incurvo-scaberulo, ramis brevissimis suberectis, pedicellis 2–4 mm. longis incurvo-scaberulis, bracteis linearibus interdum foliaceis 4–7 mm. longis persistentibus acutis fere glabris ciliolatis; hypanthium glabrum vel sparse minuteque puberulum 1 mm. longum; calyx glaber 1.8–2 mm. longus 5-fidus, laciniis late oblongis vel ovalibus obtusis viridibus; corolla 13–14 mm. longa extus glabra, tubo basi paullo ampliato superne sensim dilatato, ore 4–5 mm. lato, lobis oblongis 3 mm. longis obtusis intus minute papillosis; fructus subglobosus glaber 6–7 mm.

longus vix costatus.—Ecuador: "Quito," *Jameson* (Herb. Kew., type).

**Palicourea lasiantha** Krause, Bot. Jahrb. Engler 40: 341. 1908.

Andes, 2,700 m., *Pearce* (K). Also in Peru and Bolivia.

A shrub about 3 m. high, nearly glabrous; stipules 4–7 mm. long, bifid, the lobes rounded; leaves petiolate, firm, oblong to elliptic, large, short-acuminate, at the base acute to rounded, glabrous or nearly so; inflorescence paniculate, large, open or dense, many-flowered, the branches spreading or ascending; flowers pedicellate; calyx lobes ovate, acutish; corolla purple, about 2 cm. long, densely lanate, the lobes very short.

**Palicourea levis** Standl. Field Mus. Bot. 4: 336. 1929.

Andes, in 1857–59, *Spruce* (K). Pichincha, *Jameson* (K). Tungurahua, *Spruce* (K). Also in Peru.

A shrub or tree 2–6 m. high, the branchlets glabrous or minutely puberulent; stipule sheath 1.5–2.5 mm. long, the lobes narrowly triangular or broadly linear, 1.5–2 mm. long; leaves opposite, petiolate, oblong or elliptic-oblong, 5.5–11 cm. long, acute or short-acuminate, obtuse at the base or abruptly contracted, glabrous, or sparsely barbate beneath in the axils of the veins; inflorescence small, terminal, densely many-flowered, pedunculate or rarely sessile, thyrsoid-paniculate, 3–7 cm. long, the branches minutely puberulent or hirtellous, the flowers crowded, sessile; calyx teeth broadly ovate, obtuse or acutish, 0.6 mm. long; corolla white or yellowish, minutely puberulent, 5–6 mm. long, the lobes one-third as long as the tube; fruit glabrous, 5 mm. long, smooth.

**Palicourea lineata** Benth. Pl. Hartw. 192. 1845. *Uragoga lineata* Kuntze, Rev. Gen. Pl. 1: 300. 1891.

Type from forests of Guagua, western slope of Mount Pichincha, *Hartweg 1057* (fragm., ex Herb. Berol., in F). Between El Pichincha and El Atacaro, 3,300 m., *Firmin 484* (F, W). Without locality, *Jameson* (W). Malchinguí to Pomasaqui, Prov. Pichincha, 3,000–3,600 m., *Hitchcock 20889* (W, Y). Cuenca and coast cordillera, 2,100–2,700 m., *Pearce 379* (K). Western side of Pichincha, 2,700 m., *Jameson 83* (K). Tigua, *Sodiro 8427* (F, a fragm. ex Herb. Berol.).

A shrub 1–2 m. high, nearly or quite glabrous; stipule sheath 3–4 mm. long, the lobes short, oblong, obtuse; leaves petiolate, elliptic or oblong-elliptic, 7–13 cm. long, acuminate, at the base acute or obtuse, thick, glabrous or nearly so, paler beneath; panicles pedunculate, small, as broad as long, dense, the branches mostly spreading; flowers pedicellate; calyx lobes ovate, obtuse; corolla blue, glabrous, slender, 12–18 mm. long; fruit 5–6 mm. long.

**Palicourea Lobbii**, sp. nov.—Frutex, ramis vetustioribus crassiusculis rimosis olivaceis glabratis, novellis gracilioribus dense scaberulis, internodiis elongatis; stipulae in vaginam scaberulam

truncatam 1–1.5 mm. longam connatae, vagina in lobos 4 lineares scaberulos remotos 2–3 mm. longos desinente; folia opposita, petiolo crassiusculo 2–4 mm. longo dense scaberulo; lamina lanceolato-oblonga vel ovato-oblonga 2.5–4.5 cm. longa, 1–1.5 cm. lata, longissime attenuato-acuminata, acumine angusto acuto saepe falcato, basi obtusa vel subacuta, subcoriacea, supra viridis, scaberula, costa paullo prominente, nervis obscuris, subtus pallidior, ad nervos minute incurvo-hispidula, costa gracili elevata, nervis lateralibus utroque latere c. 9, angulo lato adscendentibus, arcuatis, marginem revolutum fere attingentibus, nervulis non elevatis arcte reticulatis; inflorescentiae terminales plerumque sessiles et e basi trichotomae, pauciflorae, folioso-bracteatae, ramis suberectis dense minuteque hispidulis, floribus sessilibus vel 1 mm. longe pedicellatis, bracteis minoribus linearibus vel subulatis scaberulis 2–5 mm. longis; hypanthium hispidulum; calyx minute hispidulus, lobis ovato-oblongis subacutis 1 mm. longis; corolla caerulea extus glabra vel hinc inde hispidula, in alabastro apice anguste rotundata, 1 cm. longa, tubo gracili ore 2 mm. lato; fructus ovalis glabratus apice rotundatus 5–6 mm. longus tenuiter et obtuse costatus.—Ecuador: Without definite locality, *Lobb* (Herb. Kew., type).

In size and shape of the leaves as well as in general appearance this Ecuadorean plant is similar to *P. Lechleri* Standl., of Peru, but the pubescence of the two is clearly distinct.

**Palicourea lugubris** Schum. & Krause, Bot. Jahrb. Engler 40: 337. 1908.

Dense forest near Naranjal, *Lehmann 5652* (F, type collection; photo. of type, ex Herb. Berol., in F). Balao, in forest, *Eggers 14133* (F, L). San Ignacio, Prov. Guayas, *Heilborn 8* (F, S). Also in Colombia.

A nearly glabrous shrub 2 m. high; stipules lobed almost to the base, 7–8 mm. long, the lobes lance-oblong, acute; leaves short-petiolate, thin, blackish when dried, elliptic-oblong or oblong-lanceolate, 8–17 cm. long, 4–6 cm. wide, acuminate, at the base cuneately narrowed, glabrous; inflorescence pedunculate, cymose-corymbose, as broad as long, dense, the branches ascending, puberulent, the bracts linear; flowers short-pedicellate; calyx lobes linear-oblong, acute; corolla tubular, white or purplish, sparsely puberulent or glabrous, 8–10 mm. long, the lobes short, acute; fruit subglobose, 4 mm. in diameter.

**Palicourea macrobotrys** (R. & P.) R. & S. Syst. Veg. 5: 194. 1819. *Psychotria macrobotrys* R. & P. Fl. Peruv. 2: 57. *pl. 203, f. a.* 1799. *Palicourea Williamsii* Rusby, Descr. N. Sp. S. Amer. Pl. 142. 1920.

No Ecuador specimens have been seen by the writer. Rusby, in describing *P. Williamsii*, states that that species is represented by a specimen collected in Ecuador by Pearce. Since *P. macrobotrys*

occurs in both Peru and Colombia, it is probable that it is native also in Ecuador. The species extends to Bolivia and Brazil.

A shrub, the branches densely pubescent; stipule sheath 4 mm. long or less, the lobes subulate, usually longer than the sheath; leaves short-petiolate, lance-oblong or narrowly elliptic-oblong, thin, long-acuminate, acute at the base, finely soft-pubescent beneath over the whole surface; inflorescence thyrsoid, pedunculate or sessile, elongate and narrow, with very short branches, the flowers pedicellate; calyx minute, the lobes broadly ovate, acute; corolla yellow, tubular, 1 cm. long, pubescent; fruit 3.5–4 mm. long.

**Palicourea myrtifolia** Schum. & Krause, Bot. Jahrb. Engler 40: 334. 1908.

Eastern Andes near Loja, in dense forest along Río Sabanilla, 1,000–1,500 m., *Lehmann 4934* (F, W, type collection; photo. of type, ex Herb. Berol., in F). Near Matala, 2,500–3,000 m., *Lehmann 7931* (F). Without locality, *André K504* (K).

A slender, nearly glabrous shrub 3 m. high; stipules 3–4 mm. long, the lobes subulate; leaves petiolate, small, firm, lanceolate to elliptic-oblong, 3.5–6 cm. long, 1–2.5 cm. wide, long-acuminate, at the base acute, glabrous, paler beneath; panicles pyramidal, lax, sessile or pedunculate, many-flowered, 7–10 cm. long, puberulent, the bracts small, subulate; calyx lobes ovate, acute; corolla purplish, minutely puberulent, 1 cm. long, the lobes short, obtuse.

**Palicourea oreadium,** sp. nov.—Ramuli crassiusculi subteretes densissime pilis brevibus patentibus hispidulo-tomentosi, internodiis elongatis; stipulae persistentes in vaginam 2 mm. longam truncatam dense hispidulo-tomentosam connatae, vagina in lacinias 4 oblongo-triangulares obtusas 2 mm. longas puberulas approximatas desinente; folia opposita, petiolo crassiusculo 1–1.5 cm. longo dense hispidulo; lamina subcoriacea, elliptico-oblonga vel ovato-oblonga, 7.5–10 cm. longa, 3.5–4 cm. lata, acuminata, acumine triangulari acuto, basi obtusa vel subrotundata, supra viridis, sparse scaberula, ad nervos hispidula, nervis non elevatis, subtus paullo pallidior, ubique dense molliterque hispidula, costa crassa elevata, nervis lateralibus utroque latere c. 11, prominentibus, angulo acuto adscendentibus, arcuatis, in marginem desinentibus, nervulis prominulis arcte reticulatis; inflorescentia terminalis 4.5 cm. longe pedunculata thyrsoideo-paniculata, 6 cm. longa et aequilata, dense multiflora, ramis basalibus subverticillatis angulo lato adscendentibus, dense puberulis vel hispidulis, floribus pedicellatis, pedicellis 2–4 mm. longis puberulis, bracteis oblongis vel lanceolatis acutis vel obtusis puberulis 2–6 mm. longis; hypanthium late turbinatum 1.5–2 mm. longum puberulum vel fere glabrum; calyx 1.5–2 mm. longus minute puberulus, laciniis late oblongis vel ovalibus apice rotundatis; corolla 14 mm. longa extus versus apicem scaberula vel fere glabra, in alabastro apice obtusa, tubo crasso basi paullo ampliato, superne sensim dilatato, fauce 4 mm. lato, lobis 5 ovatis obtusis suberectis 2.5 mm. longis intus

papillosis; antherae semiexsertae.—Ecuador: Ravine of Tabacay near Azogues, alt. 3,000 m., *Jameson* (Herb. Kew., type; photo. in herb. Field Mus.).

Apparently a close relative of *P. lineata* Benth., which is very similar in general appearance, but *P. oreadium* may be distinguished at once from that species by the dense soft pubescence of the lower leaf surface.

**Palicourea pasti** Wernham, Journ. Bot. 55: 283. 1917.

Without locality, *Jameson* (F, W). Andes, *Spruce 5466* (B, G, K, L). Also in Colombia.

A glabrous shrub or small tree, sometimes 6 m. high; stipules 6–11 mm. long, the lobes broad, rounded at the apex, ciliate; leaves petiolate, elliptic-oblong to elliptic, 6.5–14 cm. long, 3–6 cm. wide, acute or obtuse, at the base acute or obtuse, sometimes sparsely hirtellous beneath along the costa; inflorescence subsessile or pedunculate, lax, many-flowered, broadly paniculate, 8–16 cm. long and broad, the pedicels 1–6 mm. long; calyx 1–1.5 mm. long, the lobes ovate or rounded, acutish or rounded at the apex; corolla 8–10 mm. long, dark purple and glabrous outside, pale lilac within, the lobes 2 mm. long.

**Palicourea pluricostata,** sp. nov.—Ramuli crassiusculi subteretes, fere laeves glabri, internodiis elongatis; stipulae in vaginam 6–9 mm. longam adpressam truncatam margine ciliolatam connatae, vagina in lacinias 4 oblongas vel lineares obtusas vel acutiusculas 6–7 mm. longas desinente; folia breviter petiolata opposita, petiolo valido 5–10 mm. longo dense puberulo; lamina crasse membranacea, elliptico-oblonga, usque ad 20 cm. longa et 7.5 cm. lata, longe acuminata, acumine angusto longe attenuato, basi acuta, conspicue pallido-marginata, supra fusco-viridis, ad costam hirtella vel puberula, aliter glabra, nervis prominulis, subtus pallida, luteo-viridis, praesertim ad nervos hirtella vel hispidula, costa gracili elevata, nervis lateralibus utroque latere c. 27, gracilibus, prominentibus, angulo lato adscendentibus, arcuatis, prope marginem conjunctis, nervulis prominentibus; inflorescentia terminalis sessilis cymoso-paniculata 10 cm. longa et 8.5 cm. lata, dense multiflora, ramis basalibus oppositis angulo lato adscendentibus, validis, dense puberulis, superioribus saepe divaricatis vel reflexis, bracteis subulatis plerumque 2–4 mm. longis, floribus dense congestis sessilibus; hypanthium dense puberulum 0.6 mm. longum; calyx 0.6 mm. longus dense puberulus 5-lobus, lobis minutis late ovatis apice rotundatis; corolla 6 mm. longa extus dense fulvo-pilosula, in alabastro apice obtusissima, tubo crassiusculo superne paullo ampliato, lobis oblongis obtusis 2.5 mm. longis; antherae exsertae lineares 2 mm. longae.—Ecuador: Tambo de Sabanilla (?), *E. André K1112* (Herb. Kew., type).

**Palicourea Seemannii,** sp. nov.—Ramuli crassiusculi in sicco fusco-olivacei minute papillosi, vetustioribus ochraceis; stipulae laxae

persistentes 7 mm. longae glabrae breviter bilobae, lobis triangularibus acuminatis sinu lato separatis; folia opposita, petiolo gracili 7–16 mm. longo supra sulcato glabro; lamina elliptico-oblonga, rarius obovato-oblonga, 7.5–12 cm. longa, 2.2–5 cm. lata, crasse papyracea, apice abrupte breviterque acuminata, acumine obtuso, basi acuta, supra viridis, sublucida, ad costam prominentem sparse pilosula, nervis manifestis sed vix elevatis, subtus vix pallidior, ad nervos pilis longis sparse pilosa, costa gracili elevata, nervis lateralibus utroque latere c. 11, prominentibus, angulo lato vel acuto adscendentibus, gracilibus, leviter arcuatis, marginem attingentibus; inflorescentia sessilis late paniculata, c. 3 cm. longa et 5 cm. lata, laxe multiflora, basi trichotoma, ramulis divaricatis dense puberulis; bracteae subulatae vel anguste triangulares 1.5–3 mm. longae glabrae; flores conferti sessiles vel subsessiles; hypanthium turbinatum glabrum 1 mm. longum; calyx 0.8 mm. longus glaber 5-lobus, lobis late triangulari-ovatis obtusis vel subacutis; corolla infundibuliformis 6 mm. longa extus glabra, tubo basi paullo ampliato superne dilatato, lobis oblongis obtusis fere 2 mm. longis; antherae semiexsertae.—Ecuador: Without locality, *B. Seemann* (Gray Herb., type). Loja, August, 1847, *Seemann 890* (K).

The plant is not obviously related to any other species of *Palicourea* occurring in western South America. It is distinguished chiefly by the small flowers and the small sessile inflorescence, hidden among the leaves.

**Palicourea stenosepala,** sp. nov.—Frutex, ramulis gracilibus olivaceis obtuse quadrangularibus glabris, internodiis 2–4.5 cm. longis; stipulae persistentes 3–4 mm. longae bipartitae, lobis ovatis obtusis extus strigillosis; folia opposita, petiolo 1.2–3.3 cm. longo gracili glabro vel sparse hispidulo; lamina elliptico-oblonga vel obovato-oblonga, 9–14 cm. longa, 3.5–5.5 cm. lata, abrupte acuminata vel longiacuminata, acumine angusto attenuato, basi acuta, crasse membranacea, supra viridis, glabra, nervis non elevatis, subtus pallidior, praesertim ad nervos pilis rigidiusculis patentibus hirtello-pilosa, costa valida elevata, nervis lateralibus utroque latere c. 12, gracilibus, angulo lato adscendentibus, arcuatis, prominentibus, in marginem desinentibus, nervulis reticulatis vix prominulis, margine anguste revoluto; inflorescentia terminalis thyrsoideo-paniculata laxe multiflora 1.5–4 cm. longe pedunculata, 4.5–5.5 cm. longa, c. 5 cm. lata, ramis divaricatis vel adscendentibus, infimis oppositis vel verticillatis, glabris, floribus superioribus racemosis, pedicellis plerumque 6–12 mm. longis glabris, bracteis oblongis vel linearibus 2–4 mm. longis obtusis vel acutis saepe ciliatis; hypanthium late obovoideum glabrum 2 mm. longum; calyx 4–5.5 mm. longus laciniis oblongis vel anguste oblongis glabris scaberulo-ciliatis; corolla alba extus glabra, tubo crasso 13 mm. longo superne sensim dilatato ore 5 mm. lato basi paullo ampliato, lobis ovato-triangularibus obtusis 3 mm. longis subpatentibus intus minutissime papillosis; fructus subglobosus 6–7 mm. longus glaber grosse costatus, calyce persistente

coronatus.—Ecuador: Tandacato, Prov. Pichincha, in silva primaeva, alt. 2,500 m., April 5, 1920, *I. Holmgren 465* (Stockholm Herb., type).

This species is noteworthy for the unusually long and narrow calyx lobes.

**Palicourea stipularis** Benth. Pl. Hartw. 133. 1844. *Psychotria stipularis* Rusby, Mem. Torrey Club 3³: 47. 1893.

Type from mountains of El Sisma, region of Loja, *Hartweg 749* (photo. of type collection, ex Herb. Berol., in F). Chagal, Andes of Cuenca, 2,200–2,700 m., *Lehmann 4933* (F, W). Between La Chorita and Portovelo, Prov. Oro, 1,000–2,000 m., *Hitchcock 21183* (W, Y), *21186* (W, Y). Loja, *Rose, Pachano & Rose 23295* (G, W, Y). Andes, 1,800–2,100 m., *Pearce* (K). Tungurahua, *Spruce* (K). Also in Bolivia.

A shrub or small tree, nearly glabrous; stipule sheath 4–5 mm. long, the lobes linear, distant, usually shorter than the sheath; leaves short-petiolate, elliptic-oblong, 7–20 cm. long, acuminate, at the base acute or attenuate, glabrous or pilose beneath on the nerves; panicles thyrsiform-pyramidal, pedunculate, many-flowered, dense, the branches mostly ascending, glabrous, the bracts minute; flowers pedicellate; calyx lobes minute, acute or obtuse; corolla glabrous, 12–20 mm. long, tubular, stout; fruit 5 mm. long.

The color of the corolla is reported variously as "blue," "purple," and "pink." It is not certain that all the specimens cited are referred correctly to *P. stipularis*, but they agree fairly well with the incomplete description of that species.

**Palicourea tectoneura** Schum. & Krause, Bot. Jahrb. Engler 40: 336. 1908.

Type collected on the western slope of the western Andes near Cuenca, in dense forest near Chagal, 2,000–2,700 m., *Lehmann 7930* (photo. of type, ex Herb. Berol., in F). Chagal, 2,400–2,600 m., *Lehmann K131* (K).

A tree 10 m. high, the trunk 30 cm. in diameter, the branches glabrous; stipule sheath 7–8 mm. long, the lobes very short; leaves short-petiolate, rigid-coriaceous, elliptic or ovate-elliptic, acuminate, at the base acute to rounded, 8–13 cm. long, 4.5–7 cm. wide, puberulent beneath especially on the nerves; panicles pyramidal, many-flowered, 7–12 cm. long; the branches sparsely pilosulous, the bracts subulate, 3–4 mm. long; flowers short-pedicellate; calyx lobes ovate, acute; corolla yellowish, puberulent, 5–6 mm. long, the 5 lobes subacute.

## 36. RUDGEA Salisb.

**Rudgea fimbriata** (Benth.) Standl. in Standl. & Cald. Lista Pl. Salvador 274. 1925. *Psychotria fimbriata* Benth. in Hook. Journ. Bot. 3: 226. 1841. *R. micrantha* Muell. Arg. Flora 59: 454. 1876.

El Recreo, *Eggers 15471* (F), *15571* (B, K, L, W). Also in Bolivia, Peru, Brazil, the Guianas, and Central America.

A glabrous shrub; stipules triangular-ovate, incised-laciniate; leaves subsessile, broadly elliptic to elliptic-oblong, 8–15 cm. long, acuminate, at the base obtuse; flowers sessile, cymose-paniculate, the panicles small, broad, many-flowered; calyx minutely 5-dentate; corolla 5–7 mm. long, the lobes longer than the tube; fruit ellipsoid, 5–8 mm. long.

## 37. CORYNULA Hook. f.

**Corynula pilosa** (Benth.) Hook. f. Icon. Pl. *pl. 1123*. 1872. *Mitchella pilosa* Benth. Pl. Hartw. 194. 1845.

Type from Minasbamba, near Quito, *Hartweg 1066*.

A creeping herb; leaves rounded, acute, 6–12 mm. long, truncate at the base, pilose beneath along the nerves; flowers 4–5-parted, solitary, pedicellate, the pedicels longer than the petioles; calyx lobes linear; corolla 8 mm. long, the lobes narrow, acute, pilose; fruit slightly fleshy, containing 2 ribbed nutlets.

## 38. NERTERA Banks & Soland.

**Nertera depressa** Banks & Soland. ex Gaertn. Fruct. 1: 124. *pl. 26*. 1788.

Without locality, *Jameson* (F). Ravines of Pichincha, *Jameson 747* (L). Corazón, 3,000 m., *André K515* (F). Mt. Pichincha, in paramos, 3,850 m., *Heilborn 282* (F, S). Huigra, *Rose & Rose 22491* (G). Widely distributed in the mountains of South and Central America.

A slender creeping herb, often forming dense mats over banks and rotten logs; leaves small, petioled; fruits fleshy, bright red.

MITCHELLA OVATA DC. Prodr. 4: 452. 1830. *Nertera tetrasperma* HBK. 3: 379. 1820.

The type was collected by Humboldt and Bonpland on the Volcano of Tungurahua. The name is probably synonymous with *Nertera depressa*.

## 39. MITRACARPUS Zucc.

**Mitracarpus hirtus** (L.) DC. Prodr. 4: 572. 1830. *Spermacoce hirta* L. Sp. Pl. ed. 2. 148. 1762.

Tumbaco, April, 1873, *André* (K). Near Ibarra, 2,400 m., *Jameson* (K). A widely distributed weed of tropical America.

An erect, usually much-branched annual, hispidulous or glabrate; leaves lanceolate to ovate-oblong, acute, scabrous or villous; flowers in dense axillary clusters; corolla white, not exceeding the calyx.

## 40. RICHARDIA L.

**Richardia brasiliensis** Gómez, Mem. Ipecac. 31. *pl. 2.* 1801.

Huigra, 1,200 m., *Hitchcock 20308* (W, Y). Widely distributed as a weed in South America.

A prostrate, pilose or hispid annual, often forming mats; leaves oblong to elliptic, petiolate; flowers white, in dense terminal clusters; corolla 4–6 mm. long; carpels of the fruit 3, muricate, carinate on the inner face.

Known in Brazil as "poaya," "poaya branca," and "poaya del campo."

**Richardia scabra** L. Sp. Pl. 330. 1753.

Olaya, December, 1864, *Jameson* (W). Widely distributed as a weed in tropical America.

A pilose or hispid annual, the flowers white, in dense terminal clusters; carpels of the fruit 3, sulcate on the inner face.

## 41. DIODIA L.

**Diodia dichotoma** (HBK.) Schum. in Mart. Fl. Bras. $6^6$: 11. 1888. *Spermacoce dichotoma* HBK. Nov. Gen. & Sp. 3: 348. 1819. *D. glabra* Willd. ex R. & S. Syst. Veg. 3: 532. 1818, non Pers. 1805. *Borreria dichotoma* C. & S. Linnaea 3: 340. 1828. *Triodon laxum* Spruce ex Schum. loc. cit., as syn.

Type from Ayavaca and slopes of Mount Tungurahua, *Humboldt & Bonpland* (photo. of type, ex Herb. Berol., in F). Andes of Ecuador, *Spruce 5997* (G). Near Loja, September, 1864, *Jameson* (S); October, 1864, *Jameson* (S). Roadsides near Quito, *Holmgren 522* (F, S). Schumann reports also *Jameson 792*. Also in Peru.

Plants small, erect, suffrutescent; leaves lanceolate or oblong-lanceolate, 1–2 cm. long, acuminate, scabrous above, pilosulous beneath along the nerves or glabrous; flowers in small terminal cymes; fruit glabrate, the cocci scarcely carinate.

**Diodia prostrata** Sw. Prodr. Fl. Ind. Occ. 30. 1788.

Puna, *Andersson 73* (S), *74* (S). Chanduy, *Spruce 6466* (S). Also in Brazil, Central America, and Jamaica.

Plants annual, sometimes somewhat woody at the base, the stems hispid; leaves linear, acuminate, mucronate, 1.5–2.5 cm. long, 2–3 mm. wide, pilose above, aculeolate-serrulate; flowers axillary, solitary or geminate, short-pedicellate; corolla 3 mm. long; fruit 3 mm. long, obscurely costate dorsally, hispidulous.

**Diodia radula** (Willd. & Hoffmannsegg) S. & C. Linnaea 3: 342. 1828. *Spermacoce radula* Willd. & Hoffmannsegg ex R. & S. Syst. Veg. 3: 531. 1818.

Reported from Albemarle, Charles, Chatham, and James Islands of the Galapagos group. Also in Brazil.

A perennial herb, the stems prostrate or ascending, elongate, puberulent, the younger ones sometimes grayish-tomentose; leaves broadly elliptic to oblong-lanceolate, 2.5–5 cm. long, acute at the base and apex, sessile, scabrous above, pilose beneath, plicate-nerved; flowers in 6–10-flowered clusters; hypanthium puberulent and pilose, the 4 calyx lobes unequal, subulate; corolla 1 cm. long; fruit 3 mm. long, 4–5 mm. wide, the cocci subglobose, 3-sulcate.

The plant is reported to grow in the Galapagos at elevations of 270–1,050 m.

**Diodia rigida** (Willd.) C. & S. Linnaea 3: 341. 1828. *Spermacoce rigida* Willd. ex R. & S. Syst. Veg. 3: 531. 1818.

Playas, Prov. Guayas, *Mille 193* (W). Widely distributed in tropical America, growing usually in open grassland.

An erect or ascending annual or perennial with linear-lanceolate leaves 2–4 cm. long; leaves scabrous or hispidulous; flowers lavender, sessile in the leaf axils, usually solitary; fruit hispidulous or glabrate, 3-costate dorsally.

## 42. SPERMACOCE L.

**Spermacoce glabra** Michx. Fl. Bor. Amer. 1: 82. 1803.

Between Guayaquil and Salinas, Prov. Guayas, 100 m., *Hitchcock 19982* (W, Y). Widely distributed in tropical America, but seldom if ever very plentiful.

A glabrous annual weed; leaves lanceolate to elliptic; flowers minute, white, sessile and clustered in the leaf axils; fruit glabrous.

**Spermacoce tenuior** L. Sp. Pl. 102. 1753.

Between Guayaquil and Salinas, Prov. Guayas, 100 m., *Hitchcock 20082* (W). Puna, *Andersson 72* (S); reported from the Galapagos Islands. Widely distributed in tropical America.

An annual weed, more or less pubescent, the leaves mostly lanceolate or oblong; flowers white or pinkish, in sessile axillary clusters; fruit pubescent.

## 43. BORRERIA Mey.

**Borreria Anderssonii,** sp. nov.—Herba ut videtur annua, caulibus crassiusculis, decumbentibus vel suberectis, subteretibus, pauciramosis, glabris, internodiis elongatis; stipulae in vaginam 4 mm. longam connatae, vagina truncata brunnescenti glabra apice aristis pluribus 2–3.5 mm. longis glabris onusta; folia opposita, interdum in axillis fasciculata, lanceolato-linearia vel anguste oblongo-lanceolata, 2–4.5 cm. longa, 3–8 mm. lata, acuta vel longe attenuato-acuminata, basin versus angustata et breviter petiolata, membranacea, supra viridia, dense vel sparse scaberula, subtus pallidiora, ad nervos sparse scaberula, aliter glabra, costa gracili elevata; flores ad apices ramulorum dense capitati, capitulis multifloris 12–15 mm. latis, foliis 4–6 foliis caulinis conformibus involucratis; folia involucralia basi

ad vaginam sparse albo-villosa; calycis laciniae 4 fere liberae linearilanceolatae attenuato-acuminatae ciliatae 1.8 mm. longae; corolla 2.5 mm. longa alba extus sparse puberula; capsula 4.5–5 mm. longa oblonga 2.2 mm. lata sparse villosula.—Ecuador: Puna Island near Guayaquil, in 1852, *N. J. Andersson 71* (Herb. Stockholm, type). Between Guayaquil and Salinas, border of swamp, *Hitchcock 20082* (Y). Near Guayaquil, *Mille 92* (Y).

The present plant, which is represented by five sheets of the same collection in the Stockholm herbarium, is much like *Borreria laevis* (Lam.) Griseb. in general appearance, but it differs from that species in its larger flower heads and much larger capsules. The coarse stems seem to be somewhat succulent, rather than firm and stiff, as in *B. laevis*.

**Borreria basalis** Anderss. Vet. Akad. Handl. Stockh. 1853: 191. 1854.

Type collected on Chatham Island, Galapagos Islands, by Andersson.

Plants glabrate, about 30 cm. high, woody, the branches ascending, glabrate; leaves sessile, linear-lanceolate, mucronate, revolute, glabrous, 4–6 mm. long; calyx teeth ovate, longer than the corolla.

**Borreria Baurii** Rob. & Greenm. Amer. Journ. Sci. 50: 140. 1895.

Known only from the type, collected on Chatham Island, Galapagos Islands, by G. Baur.

Stems woody at the base; leaves ovate to ovate-lanceolate, hispid-ciliate, scabrous or smooth above, glabrous beneath, 5–7 mm. long; flowers 3–4 in each of the upper axils; calyx lobes ovate, acute; corolla slightly longer than the calyx lobes; fruit hispidulous.

**Borreria dispersa** Hook. f. Trans. Linn. Soc. 20: 217. 1847.

Reported from Albemarle, Charles, Chatham, Indefatigable, and James Islands of the Galapagos.

Root woody; stems diffuse, prostrate, dichotomous, acutely tetragonous, shining, glabrous or very minutely puberulent; leaves subsessile, broadly elliptic, mucronate, glabrate above, glabrous beneath, the margins subrecurved, ciliate; corolla scarcely exceeding the calyx.

**Borreria divaricata** Hook. f. Trans. Linn. Soc. 20: 219. 1847.

Known only from Charles Island of the Galapagos; collected by Darwin and Baur.

Stems prostrate (?), woody, the branches terete, divaricately branched, virgate, remotely leafy, the epidermis pale ashy, the young branchlets 4-angled, scaberulous; leaves fasciculate, small, oblong, obtuse, coriaceous, rigid, ciliate, hispidulous on the upper surface; flowers inconspicuous; calyx lobes acuminate, subciliate; corolla tube short, barbate with long hairs in the throat; fruit glabrous.

**Borreria ericaefolia** Hook. f. Trans. Linn. Soc. 20: 218. 1847.

James Bay, James Island, Galapagos, *Stewart 3487* (F). Described from Chatham Island. Reported also from Abingdon, Albemarle, Charles, Indefatigable, James, Jervis, and Narborough Islands of the Galapagos.

Glabrous throughout; stems stout, woody, the numerous branches nearly simple, strict, erect, slender, terete, the young branches 4-angled; leaves small, fasciculate on the short lateral branchlets, linear-subulate, slightly curved, pungent, rigid-coriaceous, the margins revolute; fruit glabrous.

**Borreria falcifolia** Hook. f. Trans. Linn. Soc. 20: 219. 1847.

Known only from the type, collected on Albemarle Island of the Galapagos group.

Stems terete, stout, woody, the branches elongate, strict, slender, sparsely branched, the branchlets divaricate, angulate, glabrate; leaves small, linear, obtuse, subattenuate at the base, scaberulous above, sulcate along the costa, the margins scaberulous, revolute; fruit glabrous.

**Borreria galapageia** Rob. & Greenm. Amer. Journ. Sci. 50: 140. 1895.

Duncan Island of the Galapagos group, the type collected by G. Baur.

Stems slender, woody, the branches approximate, ascending, densely pubescent, leafy; leaves ovate-oblong, 4–6 mm. long, 2–3 mm. wide, with fascicles of smaller leaves in their axils, obtuse, densely grayish-pubescent on both surfaces, the margins strongly revolute; flowers about 2 in each of the upper axils; calyx lobes acute, about equaling the corolla, rough-pubescent; fruit rough-pubescent.

**Borreria laevis** (Lam.) Griseb. Goett. Abh. 7: 231. 1857. *Spermacoce laevis* Lam. Ill. 1: 273. 1791.

Without locality, *Eggers 15029* (F). La Chonta, *Rose, Pachano & Rose 23471* (G, W, Y). Huigra, 1,500 m., *Rose & Rose 22287* (G, W, Y). Bucay, *Rose & Rose 22441* (G, Y). Cerro Maglar Alto, 360 m., *Anthony & Tate 2* (W). Caraques, *Anthony & Tate 82* (W). Caraques Bay, *Anthony & Tate 126* (W). Near Guayaquil, *Mille 174* (W). Balao, *Eggers 14095* (L, W). Loja, October, 1864, *Jameson* (S). San Ignacio, Prov. Guayas, *Holmgren 17* (S). Widely distributed as a weed in tropical America.

An annual; leaves petioled, usually more or less pilose beneath; flowers white, in dense, terminal and axillary clusters; calyx lobes 4, minute.

**Borreria linearifolia** Hook. f. Trans. Linn. Soc. 20: 217. 1847.

Type collected on James Island, Galapagos Islands, by Darwin.

Stems elongate, slender, procumbent, divaricately branched, subterete and somewhat woody, the branchlets acutely 4-angled, gla-

brous, shining; leaves spreading, linear-lanceolate, acute, mucronate, flat, sparsely hispid-pilose above, the margins recurved, ciliate, glabrous beneath.

**Borreria ocimoides** (Burm.) DC. Prodr. 4: 544. 1830. *Spermacoce ocimoides* Burm. Fl. Ind. 34. *pl. 13, f. 1.* 1768.

Near Ibarra, 2,400 m., *Jameson 673* (K), *674* (K). Widely dispersed in tropical America, and in Asia and Africa.

A slender branched annual, nearly or quite glabrous; flowers white, minute, densely clustered in the leaf axils; sepals 4; stamens included; fruit glabrous or puberulent.

**Borreria ovalis** Anderss. Vet. Akad. Handl. Stockh. 1853: 192. 1854.

Charles Island, Galapagos group, the type collected by Andersson.

Plants 30 cm. high, woody below, the branches glabrate; leaves sessile, elliptic, spreading, 6–8 mm. long, 4–5 mm. wide, mucronate, revolute, ciliate-hispidulous, glabrous beneath, coriaceous; calyx lobes linear, acute; fruit large, hirtous or glabrate.

**Borreria ovalis** Anderss. f. **abingdonensis** Robinson, Proc. Amer. Acad. 38: 205. 1902.

Type collected on Abingdon Island, Galapagos, *Baur 142.*

Leaves as much as 1.5 cm. long, more or less acute.

**Borreria pacifica** Rob. & Greenm. Amer. Journ. Sci. 50: 140. 1895.

Indefatigable Island, Galapagos, the type collected south of Conway Bay by G. Baur.

Woody, the stems terete, the branches numerous, ascending or widely spreading, mostly simple, scabrous-puberulent, 4-angled; leaves oblong-lanceolate, sessile, acute, mucronate, scabrous above, glabrous beneath or nearly so, 7–12 mm. long, with smaller leaves fascicled in the axils, the margins revolute; flowers 2–3 in an axil; calyx lobes lanceolate, acute, mucronate, 2–3 mm. long, about equaling the corolla; fruit with scattered grayish pubescence.

**Borreria parvifolia** Hook. f. Trans. Linn. Soc. 20: 218. 1847.

Type collected on Albemarle Island, Galapagos, by Macrae.

Branches slender, virgate, ramulose, subterete or angulate below, the branchlets short, leafy; leaves small, fasciculate, coriaceous, linear-obovate, obtuse, the margins scarcely recurved, hispid above, glabrate beneath; fruit glabrous.

**Borreria perpusilla** Hook. f. Trans. Linn. Soc. 20: 218. 1847.

Type collected on James Island of the Galapagos by Darwin.

Plants hispidulous, the root woody, the branches divaricate, acutely 4-angled; leaves linear-oblong or elliptic-lanceolate, acute,

hispid-pilose above, glabrous beneath, the margins revolute, ciliate; flowers rather large; corolla campanulate, twice as long as the calyx; fruit pilose.

**Borreria rotundifolia** Anderss. Om Galap. Veg. 77. 1857.

Type collected on Indefatigable Island of the Galapagos by Andersson.

**Borreria suaveolens** Mey. Prim. Fl. Esseq. 81. *pl. 1.* 1818. *Spermacoce tenella* HBK. Nov. Gen. & Sp. 3: 345. 1819. *B. tenella* C. & S. Linnaea 3: 317. 1828.

Hills near Loja, September, 1864, *Jameson* (S, W); October, 1864, *Jameson* (S). Perucho, on dry hills, *Jameson 646* (P). Widely distributed in tropical America.

An erect perennial, nearly glabrous, with linear to lanceolate leaves; flowers white, in dense, chiefly terminal heads; calyx lobes 4.

**Borreria suberecta** Hook. f. Trans. Linn. Soc. 20: 217. 1847.

Type from Albemarle Island, and reported from Barrington Island, Galapagos Islands.

Plants hispid-pilose, the stems woody below, the branches striate, suberect, virgate, acutely 4-angled, leafy; leaves linear, pungent, spreading or curved, the margins revolute, hispid-pilose on both surfaces, coriaceous; calyx lobes ovate-lanceolate, acuminate, about equaling the corolla; fruit pilose.

## 44. RELBUNIUM Hook. f.

**Relbunium ciliatum** (R. & P.) Hemsl. Biol. Centr. Amer. Bot. 2: 62. 1881. *Galium ciliatum* R. & P. Fl. Peruv. 1: 59. 1798. *G. involucratum* HBK. Nov. Gen. & Sp. 3: 335. 1819. *Rubia hirta* HBK. Nov. Gen. & Sp. 3: 338. 1819. *G. sessiliflorum* Willd. ex Schult. Mant. 3: 179. 1827. *Rubia tuberculosa* Benth. Pl. Hartw. 195. 1845. *G. Benthamianum* Walp. Repert. Bot. 6: 17. 1861. *G. Kunthii* Wedd. Chlor. And. 2: 38. 1857. *Relbunium tuberculosum* Ball, Journ. Linn. Soc. 22: 42. 1885.

Antisana, November 3, 1858, *Jameson* (P). Cuenca, *Rose, Pachano & Rose 22830* (G, W, Y). Urbina, Chimborazo, 3,420 m., *Anthony & Tate 382* (W). Quitensian Andes, 1855, *Couthouy* (G). Guápulo, Prov. Pichincha, 2,500 m., *Holmgren & Heilborn 182* (S). La Magdalena, Prov. Pichincha, 2,800 m., *Firmín 372* (F, W), *675* (F). Type of *Galium involucratum* from Quito, *Humboldt & Bonpland*. Type of *R. tuberculosa* from Hacienda de Antisana, *Hartweg 1076*. Ranging to Colombia and southward to Peru.

Stems elongate, glabrous; leaves oblong to linear-lanceolate, ciliate or sometimes eciliate; fruit glabrous.

**Relbunium hirsutum** (R. & P.) Schum. in Mart. Fl. Bras. $6^6$: 116. 1888. *Galium hirsutum* R. & P. Fl. Peruv. 1: 59. 1798.

Without locality, *Jameson* (F, W). Guanojo, *André 3968* (F). Quito, *Rose & Rose 23931* (W). Mount Pichincha, October, 1863, *Jameson* (W). Andes of Ecuador, *Spruce 5215* (G). Near Tulcán, 2,500 m., *Hitchcock 20970* (W, Y). Also in Colombia, and extending southward to Peru.

Stems hirtellous; leaves lance-oblong, acute, hirtellous; fruit glabrous.

**Relbunium hypocarpium** (L.) Hemsl. Biol. Centr. Amer. Bot. 2: 63. 1881. *Valantia hypocarpia* L. Syst. Nat. ed. 10. 1307. 1759.

Riobamba, *Sodiro 84-41* (B). La Rinconada, Prov. Carchi, 3,000 m., *Hitchcock 20801* in part (W, Y). Andes of Quito, in 1855, *Couthouy* (P). Cumbe, *Rose, Pachano & Rose 22981* (G, Y). Huigra, *Rose & Rose 22492* (Y). Without locality, *Seemann* (G). Quitensian Andes, 1855, *Couthouy* (G). Baños, Prov. Tungurahua, 1,800 m., *Heilborn 364* (F, S). La Planta del Chillo, Prov. Pichincha, 2,700 m., *Firmín 696* (F). Reported from the Galapagos Islands. Widely distributed in tropical America.

Stems pilose; leaves oval or elliptic, rounded to acute at the apex, usually pilose or hispidulous on both surfaces; flowers greenish yellow, the peduncles 1-flowered; fruit orange-red, hispidulous or pilose.

**Relbunium nitidum** (HBK.) Schum. in Mart. Fl. Bras. $6^6$: 114. 1888. *Rubia nitida* HBK. Nov. Gen. & Sp. 3: 339. *pl. 280.* 1819. *Galium quitense* Wedd. Chlor. And. 2: 38. 1857.

Type collected at the base of Mount Pichincha, near Quito, *Humboldt & Bonpland* (photo. ex Herb. Berol. in F). Weddell (loc. cit.) reports *Jameson 438*, from Pichincha at 3,650 m., and a specimen collected by *Remy*. Also in Colombia.

Stems pilose; leaves elliptic, obtuse, glabrous above, pilose beneath, ciliate; fruit fleshy, glabrous, orange or red.

## 45. GALIUM L.

**Galium canescens** HBK. Nov. Gen. & Sp. 3: 336. 1819.

Type from Quito, *Humboldt & Bonpland* (photo. ex Herb. Berol. in F). Andes of Quito, in 1859, *Jameson* (G). Guápulo, Prov. Pichincha, 2,500 m., *Holmgren & Heilborn 183* (F, S). Quito, *Karsten* (L). Mountains of Quito, *Jameson 196* (L). Also in Colombia and Peru.

Stems pilose; leaves in 4's, ovate, acute or acuminate, hirsute above, pubescent beneath; flowers solitary, geminate or ternate; fruit uncinate-hispid.

**Galium flaccidum** Wedd. Chlor. And. 2: 39. 1857. *Rubia debilis* HBK. Nov. Gen. & Sp. 3: 340. 1819, non *G. debile* Hoffm. & Link, 1820.

Type collected near Chillo and Falls of Ichubamba, Andes of Quito, *Humboldt & Bonpland.*

Stems uncinulate; leaves in 4's, oblong or oblong-lanceolate, acuminate, the margins and costa retrorse-aculeolate; peduncles 1-flowered; fruit glabrous.

**Galium Fraserii** Wernham, Journ. Bot. 50: 244. 1912.

Type from Ecuador, *Fraser.*

Stems minutely uncinulate on the angles; leaves in 4's, 3-nerved, oval, short-acuminate, revolute, rigid, scabrous; cymes 2–3-flowered; fruit blackish, fleshy, glabrous.

**Galium piliferum** HBK. Nov. Gen. & Sp. 3: 337. 1819.

La Rinconada, between Ibarra and Tulcán, Prov. Carchi, 3,000 m., *Hitchcock 20801* in part (W, Y). Without locality, *Sodiro 44-45* (B). Prov. Pichincha, 3,000 m., *Firmín 644* (F). Also in Colombia.

Stems retrorse-hispidulous; leaves in 6's or 8's, linear-lanceolate, setose-acuminate, retrorse-hispid on the margin and costa; peduncles 3-flowered; fruit uncinate-hispid.

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